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SXS REFRIGERATOR

SERVICE MANUAL

CAUTION

PLEASE READ CAREFULLY THE SAFETY PRECAUTIONS OF THIS BOOK BEFORE CHECKING OR OPERATING THE REFRIGERATOR.

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WARNINGS AND PRECAUTIONS FOR SAFETY

Please observe the following safety precautions in order to use safely and correctly the refrigerator and to prevent accident and danger during repair.

1. Be care of an electric shock. Disconnect power cord from wall outlet and wait for more than three minutes before replacing PWB parts. Shut off the power whenever replacing and repairing electric components.

2. When connecting power cord, please wait for more than five minutes after power cord was disconnected from the wall outlet.

3. Please check if the power plug is pressed down by the refrigerator against the wall. If the power plug was damaged, it may cause fire or electric shock.

4. If the wall outlet is over loaded, it may cause fire. Please use its own individual electrical outlet for the refrigerator.

5. Please make sure the outlet is properly earthed, particularly in wet or damp area.

6. Use standard electrical components when replacing them.

7. Make sure the hook is correctly engaged.
   Remove dust and foreign materials from the housing and connecting parts.

8. Do not fray, damage, machine, heavily bend, pull out, or twist the power cord.

9. Please check the evidence of moisture intrusion in the electrical components. Replace the parts or mask it with insulation tapes if moisture intrusion was confirmed.

10. Do not touch the icemaker with hands or tools to confirm the operation of geared motor.

11. Do not let the customers repair, disassemble, and reconstruct the refrigerator for themselves. It may cause accident, electric shock, or fire.

12. Do not store flammable materials such as ether, benzene, alcohol, chemicals, gas, or medicine in the refrigerator.

13. Do not put flower vase, cup, cosmetics, chemicals, etc., or container with full of water on the top of the refrigerator.

14. Do not put glass bottles with full of water into the freezer. The contents shall freeze and break the glass bottles.

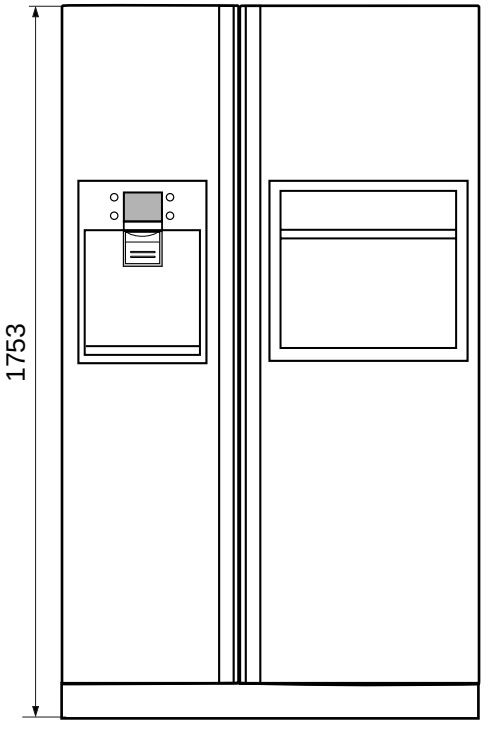
15. When you scrap the refrigerator, please disconnect the door gasket first and scrap it where children are not accessible.

SPECIFICATIONS

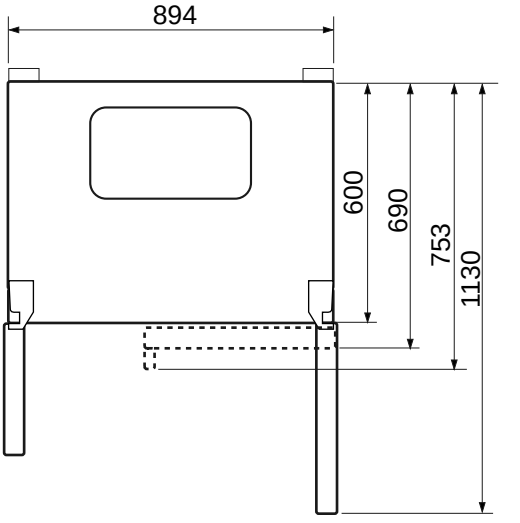
1. Ref No. : GW-P227/L227/C227/B227

ITEMS	SPECIFICATIONS
DIMENSIONS (mm)	894(W)×753(D)×1753(H)
NET WEIGHT (kg)	128(P227), 123(L227),119(B227),114(B227)
COOLING SYSTEM	Fan Cooling
TEMPERATURE CONTROL	Micom Control
DEFROSTING SYSTEM	Full Automatic
	Heater Defrost
INSULATION	Cyclo-Pentane
COMPRESSOR	P.T.C. Starting Type
EVAPORATOR	Fin Tube Type
CONDENSER	Wire Condenser
REFRIGERANT	R134a (180g)
LUBRICATING OIL	FREOL @10G (310 cc)
DRIER	ID 0.83
CAPILLARY TUBE	MOLECULAR SIEVE XH-7

ITEMS	SPECIFICATIONS
FIRST DEFROST	4 - 5 Hours
DEFROST CYCLE	13 - 15 Hours
DEFROSTING DEVICE	Heater, Sheath
ANTI SWEAT HEATER	Dispenser Duct Door Heater
	Dispenser Heater
	Home Bar Heater
ANTI-FREEZING HEATER	Damper Heater
FREEZER LAMP	40W (1 EA)
REFRIGERATOR LAMP	40W (1 EA) or 40W (2 EA)



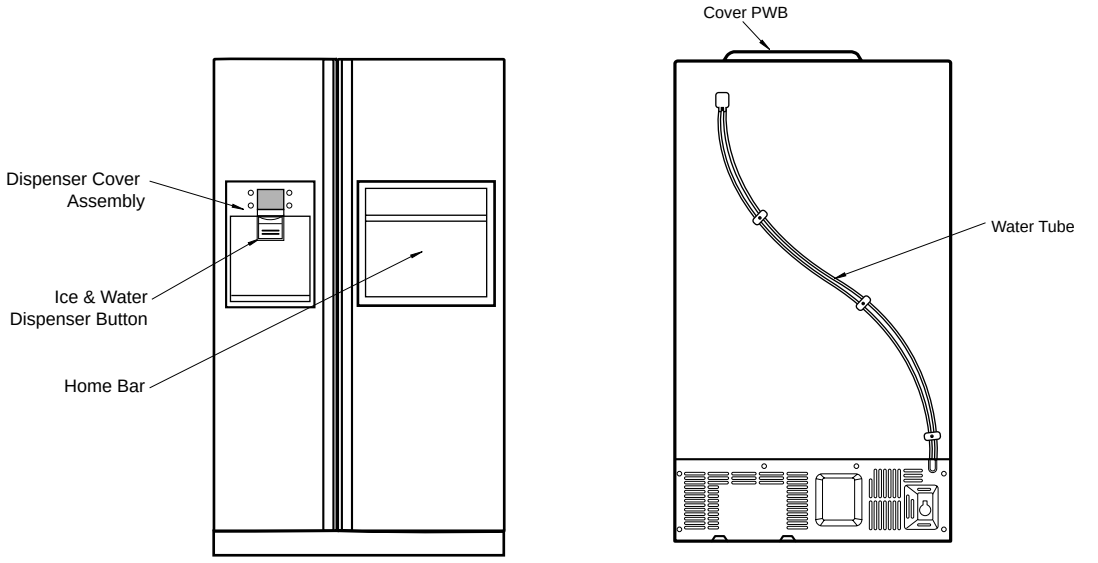
<Front View>



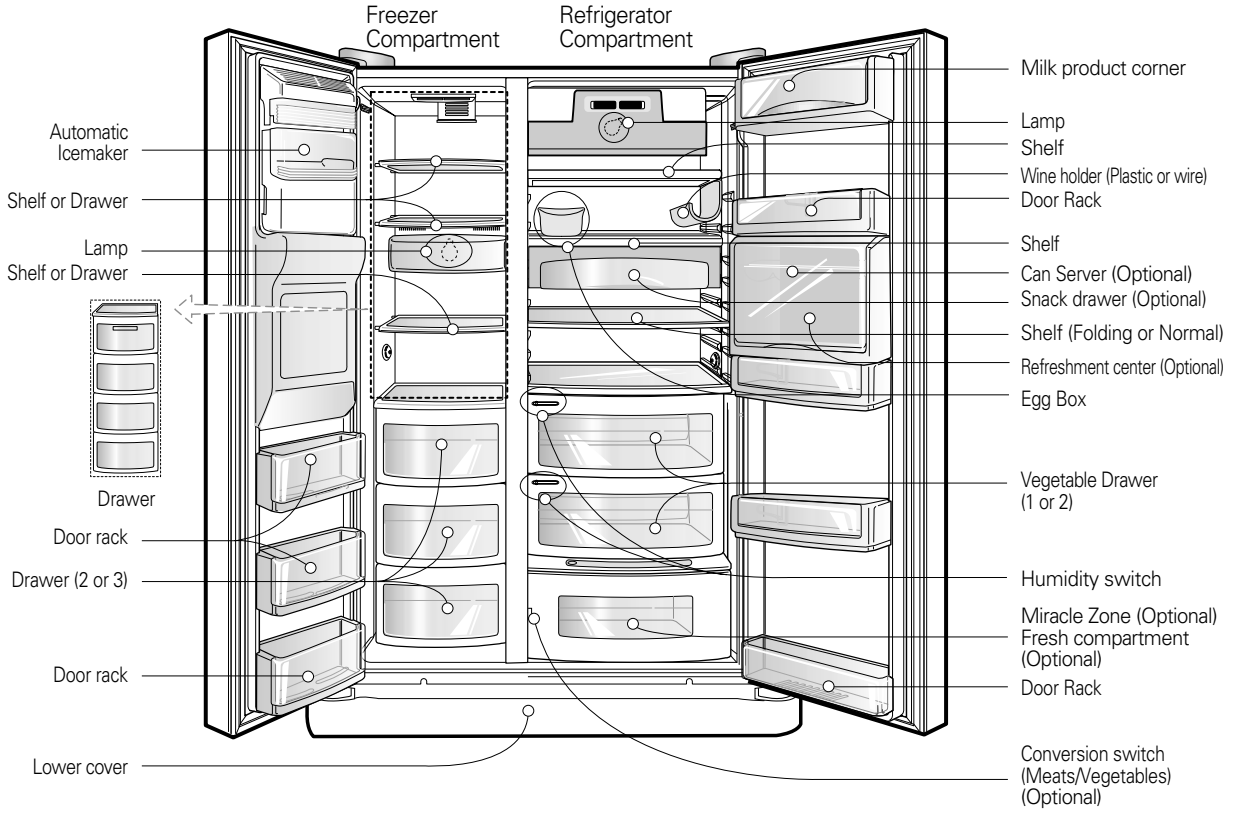
<Plane View>

PARTS IDENTIFICATION

1. Ref No. : GW-P227/L227(INTERNAL FILTER)

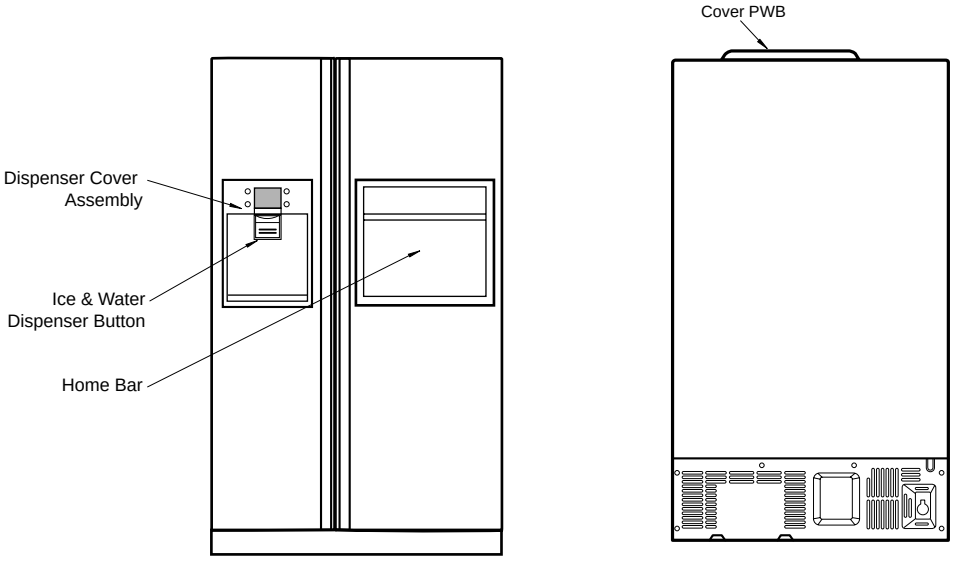


*L227: Non Home bar

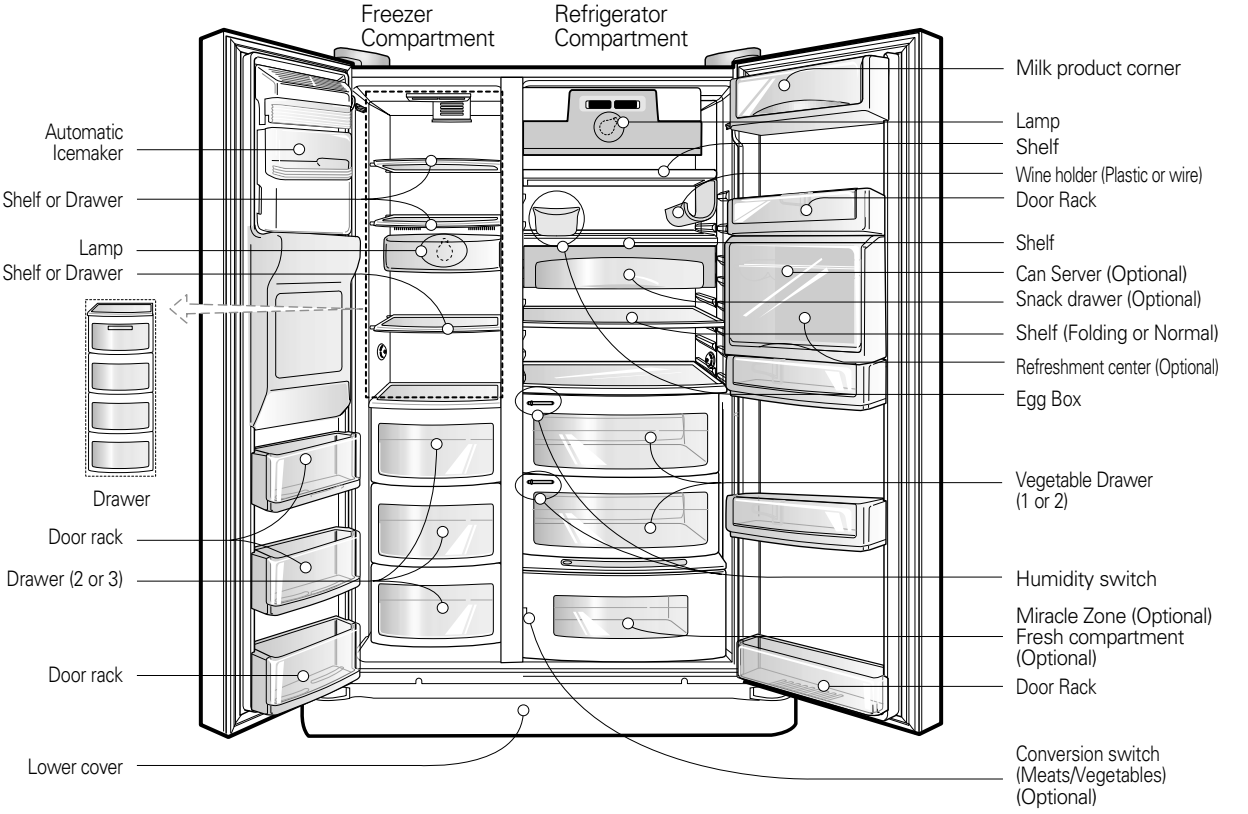


PARTS IDENTIFICATION

2. Ref No. : GW-P227/L227(EXTERNAL FILTER)

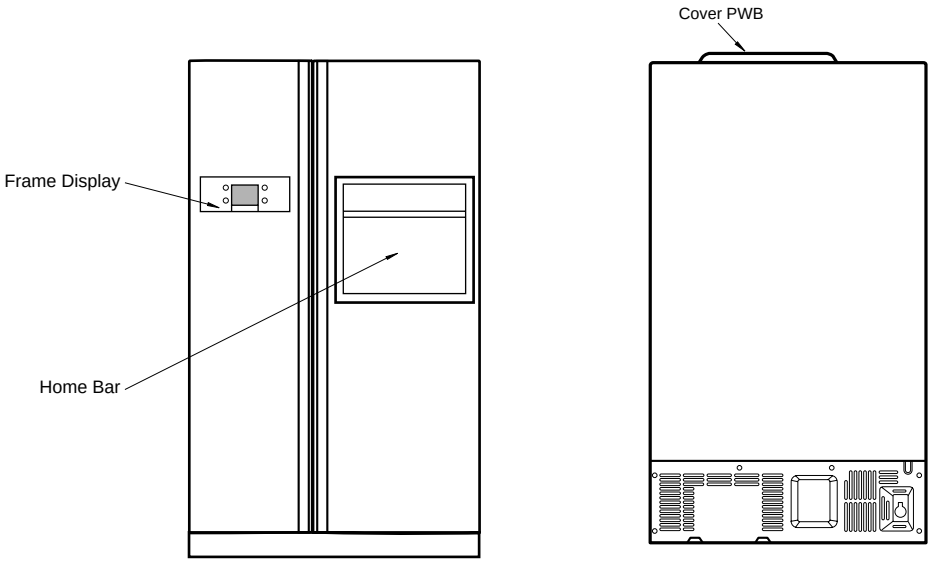


*L227: Non Home bar

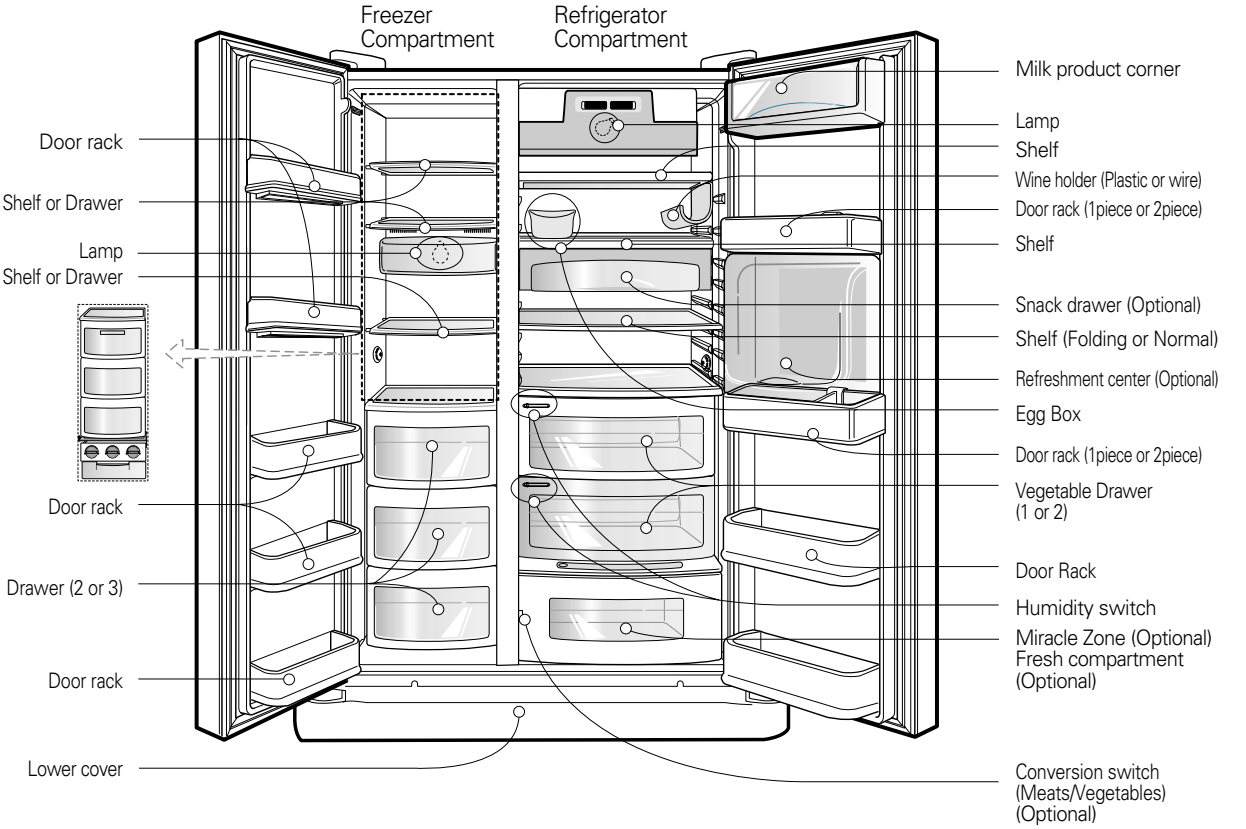


PARTS IDENTIFICATION

3. Ref No. : GW-C227/B227



*B227: Non Home bar



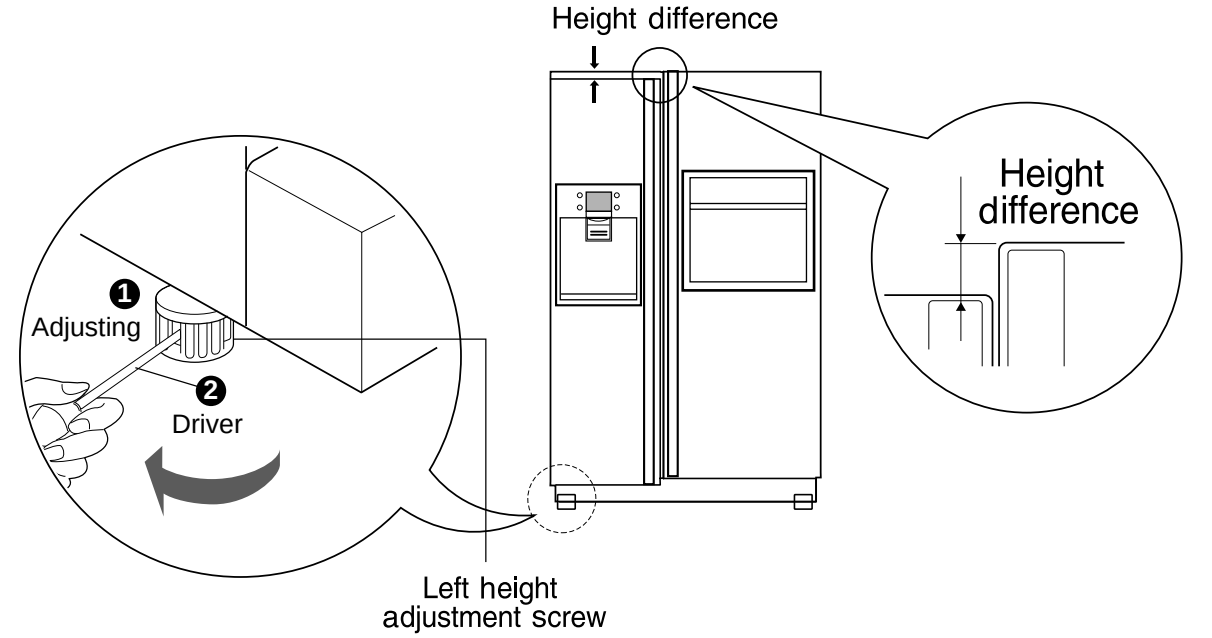
HOW TO INSTALL REFRIGERATOR

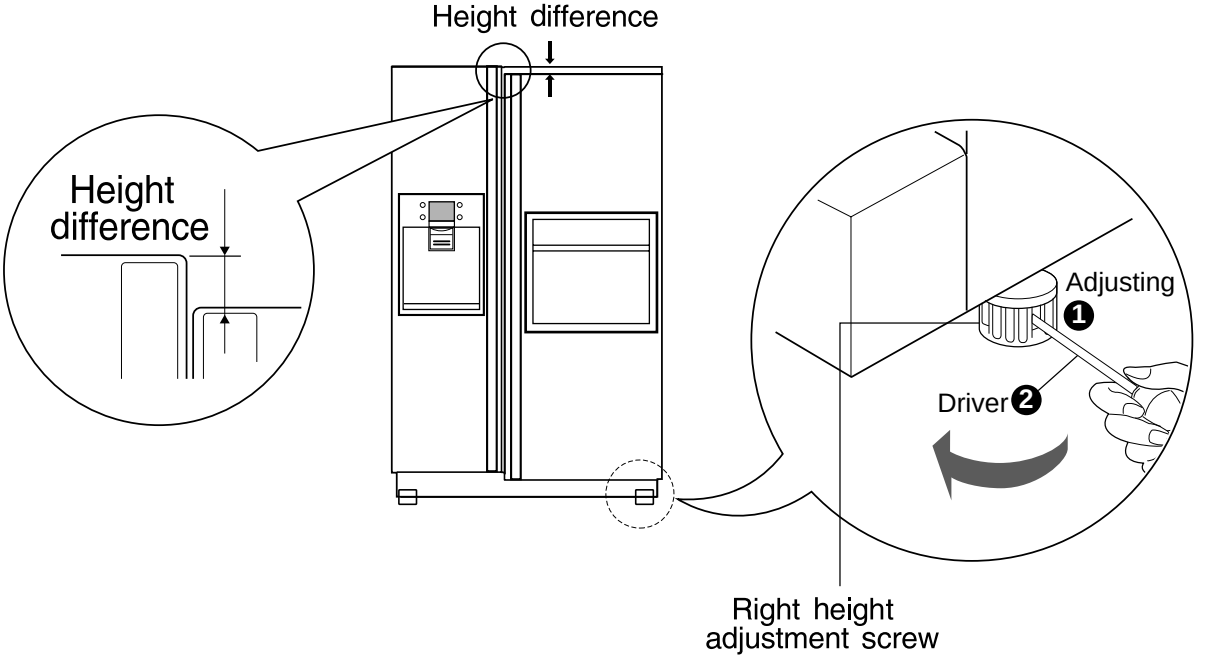
1. How to Adjust Door Height of Refrigerator

■ Make the refrigerator level first. (If the refrigerator is not installed on the flat floor, the height of freezer and refrigerator door may not be the same.)

1. If the height of freezer door is lower than that of refrigerator compartment :

2. If the height of freezer door is higher than that of refrigerator compartment :





Insert a driver ❷ into the groove ❶ of adjusting screw and rotate driver in arrow direction (clockwise) until the refrigerator becomes horizontal.

Insert a driver ❷ into the groove ❶ of adjusting screw and rotate driver in arrow direction (clockwise) until the refrigerator becomes horizontal.

HOW TO INSTALL REFRIGERATOR

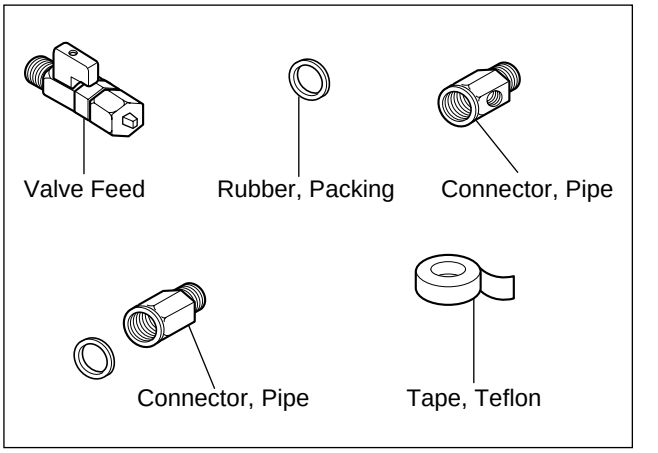
2. How to Install Water Pipe

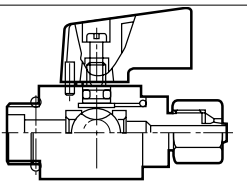
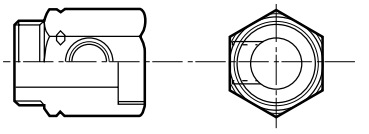
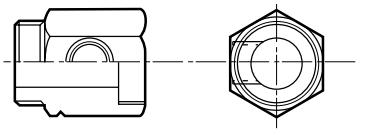
■ Before Installation

1. The icemaker requires the water pressure of 1.5 - 8.5kgf/cm^2. (It is acceptable if city water fills a cup of 180cc with water for 3 seconds)
2. Install booster pump where the city water pressure is below 1.5kgf/cm^2 for normal operation of water and ice dispenser.
3. The total length of water pipe shall be less than 12m. Do not bend the pipe at right angle. If the length is more than 12m, there will be troubles on water supply due to water pressure drop.
4. Please install water pipe where there is no heat around.

2-1. When connecting directly to the water tap.

■ Please confirm the following installation parts.



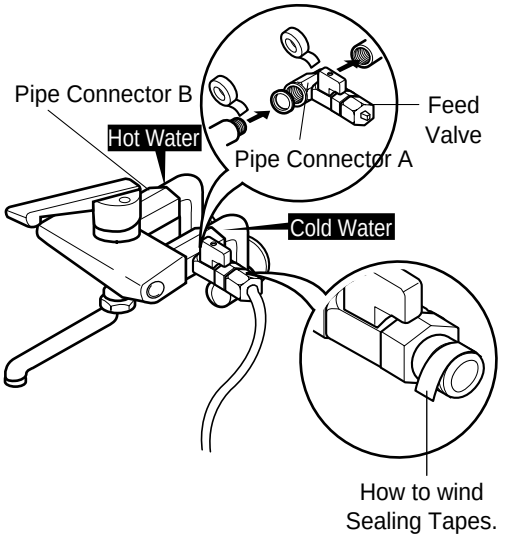
Class.	Shape and Spec.	Nomenclature	P/No	Remarks
Conve-rtible Water Valve		Valve Feed	5221JA3001A	Common Use
Water Conn-ector		Connector, (MECH) Pipe Conversion Connector(3/4") Balance Conector(3/4") Packing(ø24x3t)	4932JA3003A 6631JA3004A 6631JA3004B 3920JA3001B	No Holes
	Connector, (MECH) Pipe 	4932JA3003B Conversion Connector(W25) Balance Conectoor(W25) Packing(ø23x3t)	6631JA3004C 6631JA3004D 3920JA3001A	No Holes
		Connector, (MECH) Pipe Conversion Connector(W28) Balance Conector(W28) Packing(ø26x3t)	4932JA3003C 6631JA3004E 6631JA3004F 3920JA3001C	No Holes
		Connector, (MECH) Pipe Conversion Connector(1/2") Balance Conector(1/2") Packing(ø19x3t)	4932JA3003D 6631JA3004G 6631JA3004H 3920JA3001D	No Holes

HOW TO INSTALL REFRIGERATOR

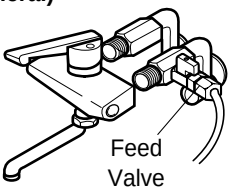
1. Connection of Pipe Connector A and B.

1) Turn off main valve of water pipe.
2) Disconnect water tap from piping by loosening nuts.
3) Connect pipe connector A and B to piping after sealing the pipe connector with sealing tapes.
4) Connect feed valve to pipe connector A.
5) If there is only one tap water pipe, connect pipe connector A only and install feed pipe.

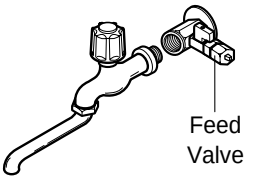
Caution : • Feed pipe should be connected to cold water line. If it is connected to hot water line, trouble may occur.
• Please check rubber packing when connecting feed pipe.



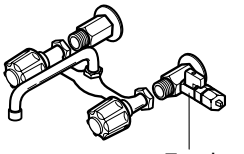
Single Lever Type Faucet (general)



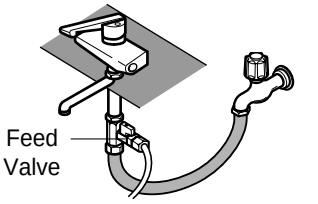
General Type



Two Hands Type Faucet



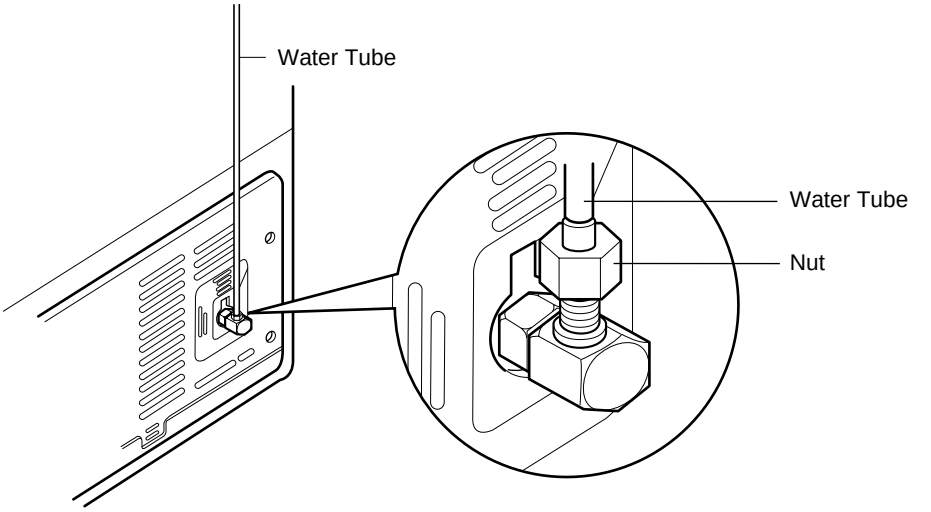
Single Lever Type Faucet (one hole, tech type and hand spray)



2. Water Supply

1) After the installation of feed water, plug the refrigerator to the earthered wall outlet, press the water dispenser button for 2 - 3 minutes, and confirm that the water comes out.

2) Check leakage at connecting part, then arrange water tube and locate the refrigerator at its regular place if there is no leaking.



HOW TO INSTALL REFRIGERATOR

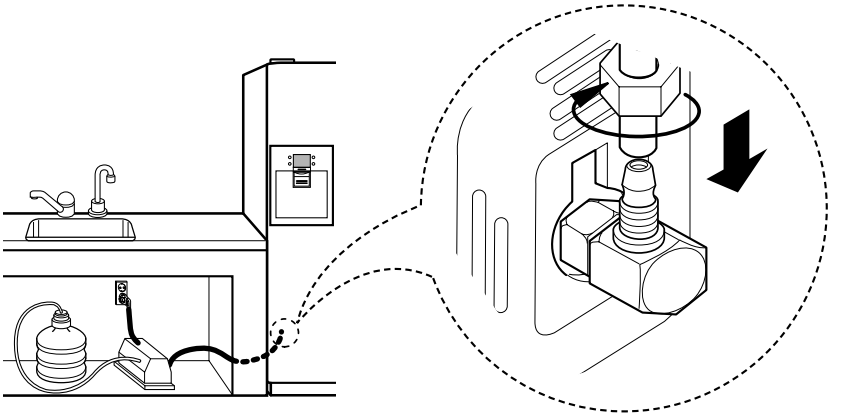
3. When customer uses bottled water.

*If customer wants to use bottled water, extra pump should be installed as shown below.

1. The pump system should not be on the floor (it may cause noise and vibration). Securely fasten the inlet and outlet nuts of pump.
2. If there is any leakage after installation, cut the water tube at right angle and reassemble.
3. When put the water tube end into the bottle, leave a clearance between bottle bottom and water tube end.

4 Check water coming out and any leakage.

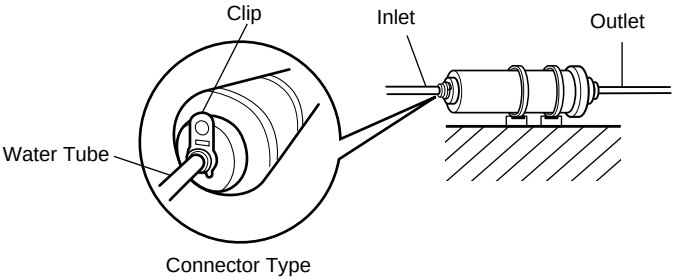
Caution : • If feed tube is more than 4m, less water will come out due to pressure drops.
• Use standard feed tube to prevent leaking.



■ Outternal Filter

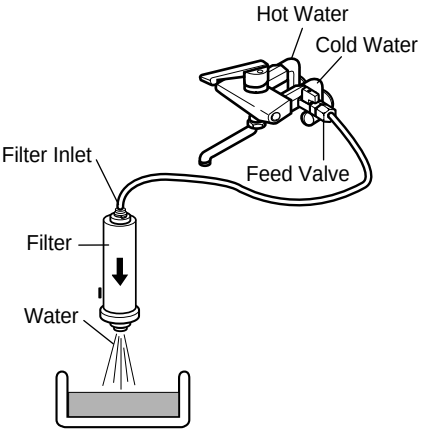
1. Filter Fixation

1) Connect feed tube to the filter outlet and water valve connecting tube.
2) Fix the filter at proper place around the sink where it is easy to replace the filter and to receive the cleaning water. Please consider the length of tube shall be less than 8m when locating filter.



2. Filter Cleaning

1) Connect feed tube to the inlet of feed valve and filter.
2) Clean the main valve and feed valve with water for at least one minute until clean water comes out.

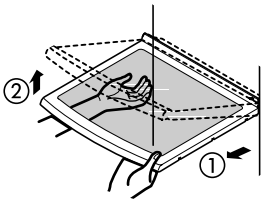


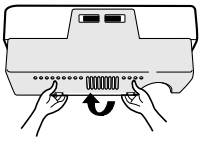
HOW TO INSTALL REFRIGERATOR

■ **Install Water Filter (Applicable to some models only)**

■ **Before Installing water filter**

1. Before installing the filter, take out the top shelf of the refrigerator after tilting it to the direction (①) and lifting it to the direction (②) and move it to the lower part.
2. Remove the lamp cover by pressing the protrusion under the cover and pulling the cover to the front.





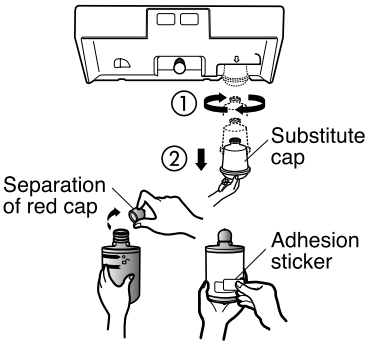
■ **Installing water filter**

1. **Initial installation of water filter**
   Remove the filter substitute cap by turning it counterclockwise (①) by 90 degrees and pulling it down.

Note : Keep it safe to use it later when you do not use the filter.

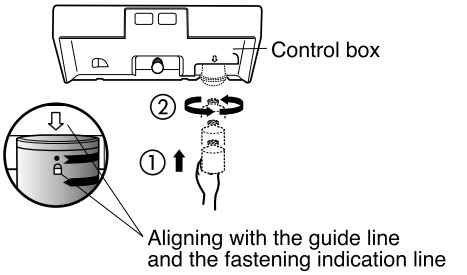
Remove the red cap from the filter and attach the sticker. Insert the upper part of the filter (①) after aligning with the guideline marked on the control box, and fasten it by turning it clockwise by 90 degrees.

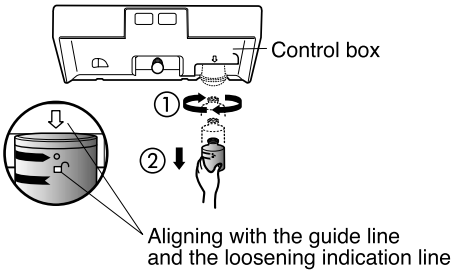
Note : Check that the guideline and the fastening indication line are aligned.



2. **Replacement of water filter**
   While holding the lower part of the filter, turn it counterclockwise (①) by 90 degrees and pull it down.

Note : Check that the guideline and the loosening indication line are aligned.



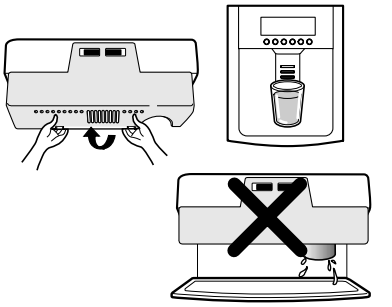


■ **After installing water filter**

Reassemble the lamp cover and the top shelf of the refrigerator. To place the top shelf of the refrigerator, raise the front part of the shelf a bit so that the hook of the shelf is fit into the groove.

In order to clean the water filter system, drain water for about 3 min.

Note : Then open the door of the refrigerator and check for water droppings on the shelf under the filter.

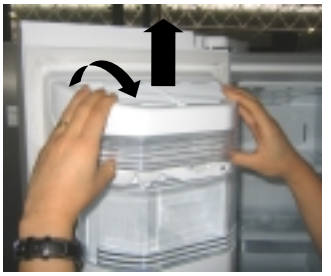


HOW TO INSTALL REFRIGERATOR

3. How to Control the Amount of Water Supplied to Icemaker.

3-1. Confirm the amount of water supplied to the icemaker.

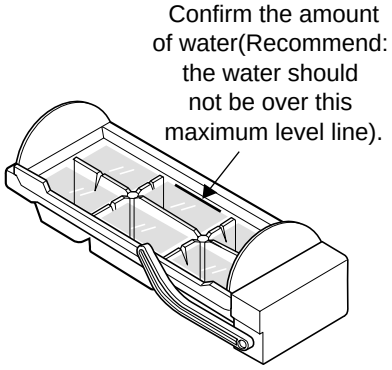
1. Remove the cover bucket : Lift the cover with a slight twisting.
2. Remove the ice bucket : Lift the lower part slightly and take the ice bucket out slowly.

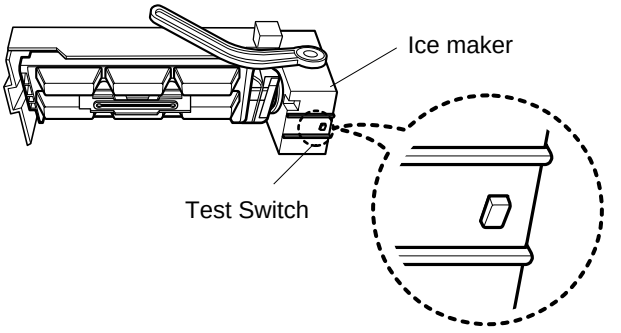


- **Caution :** • Do not put your hands or tools into the chute to confirm the operation of geared motor. It may damage refrigerator or hurt your hands.
- Check the operation of motor with its operation noise.

3. Apply electricity after connecting water pipe.

1) Press test switch under the icemaker for two seconds as shown below.
2) The bell rings(ding~dong) and ice tray rotates and water comes out from the icemaker water tube.
3) The water shall be supplied two or three times into the tray. The amount of water supplied for each time is small. Put a water container under the ice tray and press test switch.
4) When ice tray rotates, the water in it will spill. Collect the spilt water and throw away into the sink.
5) When ice tray has finished rotation, water comes out from the water tube. Confirm the amounts of water in the ice tray. (refer to fig. The optimum amount of water is 80cc)





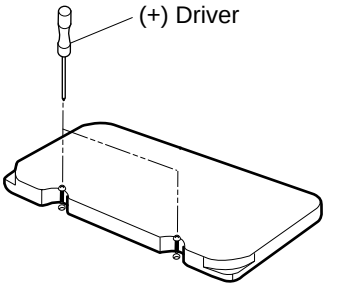
* It is acceptable if the adjusted level of water is a bit smaller than maximum level.

HOW TO INSTALL REFRIGERATOR

3-2. Control the amount of water supplied to the icemaker.

Caution : • Please unplug the power cord from the wall outlet and wait for more than three minutes before disconnecting PCB cover as 310V is applied in the control panel.

1. Disconnect PCB cover from the upper part of the refrigerator.
2. Adjust the amount of water supplied by using DIP switch.



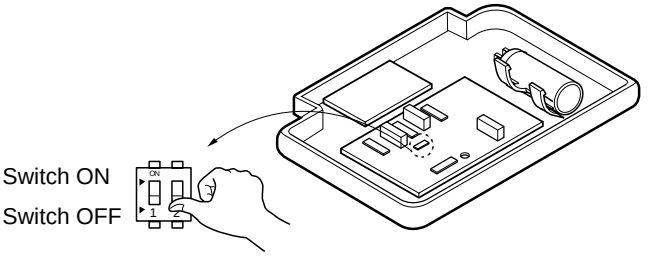
■ Water Supplying Time Control Option

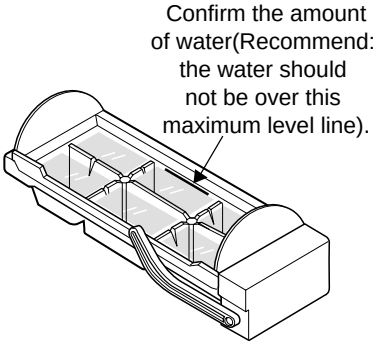
No	DIP SWITCH SETTING		WATER SUPPLY TIME	REMARKS
	S1	S2		* The quantity of water supplied depends on DIP switch setting conditions and water pressure as it is a direct tap water connection type. (the water supplied is generally 60 cc to 100 cc)
1	OFF	OFF	4.5 SEC	
2	ON	OFF	4.0 SEC	
3	OFF	ON	5.5 SEC	
4	ON	ON	6.5 SEC	* DIP switch is on the main PCB.

1) The water supplying time is set at 4.5 seconds when the refrigerator is delivered.
2) The amount of water supplied depends on the setting time and water pressure (city water pressure).
3) If ice cube is too small, increase the water supplying time. This happens when too small water is supplied into the ice tray.
4) If ice cube sticks together, decrease the water supplying time. This happens when too much water is supplied into the ice tray.

Caution : When adjusting the amount of water supplied, adjust step by step. Otherwise the water may spill over.

3. When adjustment of control switch for the amount of water supplied is complete, check the level of water in the ice tray.

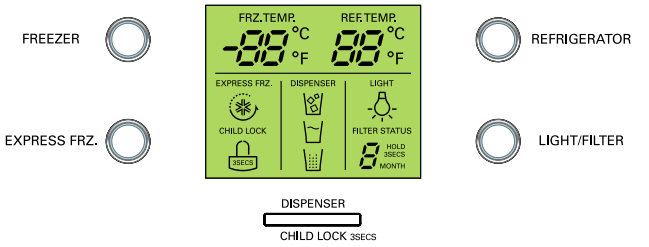
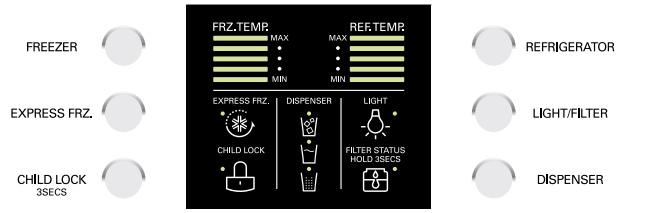




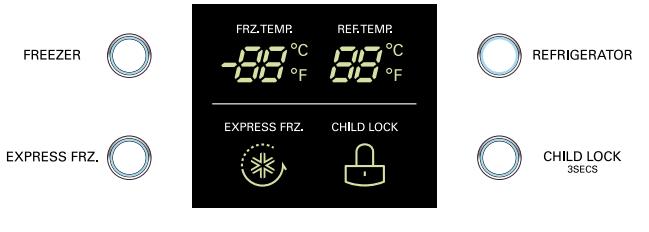
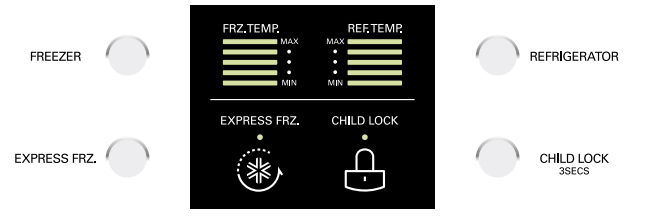
MICOM FUNCTION

1. Monitor Panel

1-1. GW-P227, GW-L227

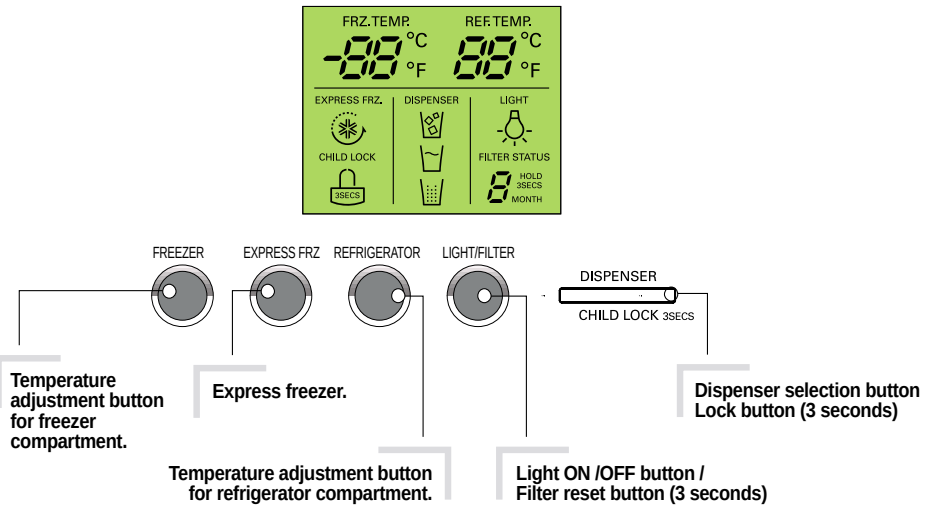
Optional	Function display board
Type-1 (88-LED)	
Type-2 (Bar-LED)	

1-2. GW-C227, B227

Optional	Function display board
Type-1 (88-LED)	
Type-2 (Bar-LED)	

MICOM FUNCTION

1-3. Display Second Function



1. Buzzer sound mute Mode

The buzzer sound is set to OFF.

It activates by sounding the recognition sound of “Ding~” after pressing and holding “Express FRZ” button more than 5 seconds. It inactivates when resetting the mode power.

2. Display Power saving Mode

It places display in standby mode until door is opened.

Press “Freezer” and “Express FRZ” buttons simultaneously to turn all leds become ON and then OFF with the recognition sound of “Ding~” after 5 seconds. (Be sure not to press only one button to work.)

Once the mode activates, the display is always OFF. Until door is opened or display button is pressed. When 30 seconds has elapsed after closing door or pressing button, the display turns OFF. To deactivate this mode is same as the activation methods. The mode inactivates when resetting the power.

3. Exhibition Mode

This function is available when exhibiting a refrigerator in the shopping moll.

Function is inserted with recognition sound “Ding ~” if pressing both the “Express FRZ” button and the “REFRIGERATOR” button at the same time for more than 5 seconds. If function is inserted, all basic refreezing functions at the R/F room and the Storage room (COMP, F-FAN, C-FAN) turns off and the display normally operates. However, the dispenser function normally operates.

The DEMO stops if pressing the button during DISPLAY DEMO, DEMO stops and the display normally operates but performs DEMO operation again if not pressing the button again for more than 30 seconds (DEMO: Display scenario when using the display).

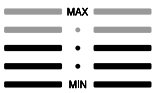
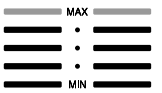
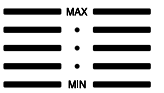
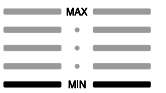
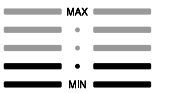
Release method is same as input method.

The mode is released if power is reset.

MICOM FUNCTION

2. Description of Function

2-1. Funnction of Temperature Selection

Division		Power Initially On	1st Press	2nd Press	3th Press	4th Press
Change of Indication Lamp	Type-1 (88-LED)	-19 °C 3 °C	-22 °C 2 °C	-23 °C 0 °C	-15 °C 6 °C	-17 °C 4 °C
	Type-2 (Bar-LED)					
Temperature Control		Middle	Middle Strong	Strong	Weak	Middle Weak
Freezer Control		(-19.0 °C) <-19.0 °C>	(-21.5 °C) <-21.0 °C>	(-22.5 °C) <-22.5 °C>	(-14.5 °C) <-14.5 °C>	(-16.5 °C) <-16.5 °C>
Refrigeration Control		(3.5 °C) <4.5 °C>	(2.5 °C) <3.5 °C>	(1.0 °C) <1.5 °C>	(7.5 °C) <8.0 °C>	(5.5 °C) <6.0 °C>

* The temperature can vary ±3 °C depending on the load condition.

*( ) : P227, L227
*< > : C227, B227

1. When power is initially applied or reapplied after power cut, “Medium” is automatically selected.
2. When the temperature selection switch in the freezer and refrigerator compartments is pressed, the light is on in the following sequence:
   "Middle" → "Middle Strong" → "Strong" → "Weak" → "Middle Weak"
3. The temperature setting condition of freezer and refrigerator compartments shall not be indicate in the standard model (GW-P227, GW-L227, GW-C227, GW-B227) when refrigerator or home bar door is closed.

MICOM FUNCTION

2-2. Automatic ice maker

- The automatic ice maker can automatically make 6 pieces of ice cube at a time, 50~60 pieces a day. But these quantities may be varied according to various conditions including how many times the refrigerator door opens and closes.
- Ice making stops when the ice storage bin is full.
- If you don't want to use automatic ice-maker, change the ice-maker switch to ON-OFF.
  If you want to use automatic ice-maker again, change the switch to OFF-ON.

NOTE : It is normal that a noise is produced when ice made is dropped into the ice storage bin.

2-3. When ice maker does not operate smoothly

Ice is lumped together

- When ice is lumped together, take the ice lumps out of the ice storage bin, break them into small pieces, and then place them into the ice storage bin again.
- When the ice maker produces too small or lumped together ice, the amount of water supplied to the ice maker need to be adjusted. Contact the service center.

✲ If ice is not used frequently, it may lump together.

Power failure

- Ice may drop into the freezer compartment. Take the ice storage bin out and discard all the ice then dry it and place it back. After the machine is powered again, crushed ice will be automatically selected.

The unit is newly installed

- It takes about 12 hours for a newly installed refrigerator to make ice in the freezer compartment.

2-4. Express freezing

1. Express freezing is function to improve cooling speed of the freezing room by consecutively operating compressors and freezing room fan.
2. Express freezing is released if power failure occurs and then returns to the original status.
3. Temperature setting is not changed even if selecting the express freezing.
4. The change of temperature setting at the freezing room or the cold storage room is allowed with express freezing selected and prrocessed.
5. The cold storage room operates the status currently set with Express freezing selected and procesed.
6. If selecting the Express freezing, the Express freezing function is released after continuously operating compressor and freezing room fan.
7. If frost removal starting time is arrived during Express freezing, Express freezing operation is done only for the remaining time after completion of frost removal when the Express freezing operation time passes 90 minutes. If passing 90 minutes, Express freezing operation is done only for 2 hours after completion of frost removal.
8. If pressing Express freezing button during frost removal, the Express freezing LED is turned on but if pressing the Express freezing, compressor operates after the remaining time has passed.
9. If selection Express freezing within 7 minutes (delay for 7 minutes of compressor) after the compressor stops, compressor operates after the remaining time has passed.
10. The freezing room fan motor operates at the high speed of RPM during operation of Express freezing.

MICOM FUNCTION

2-5. Control of variable type of freezing room fan

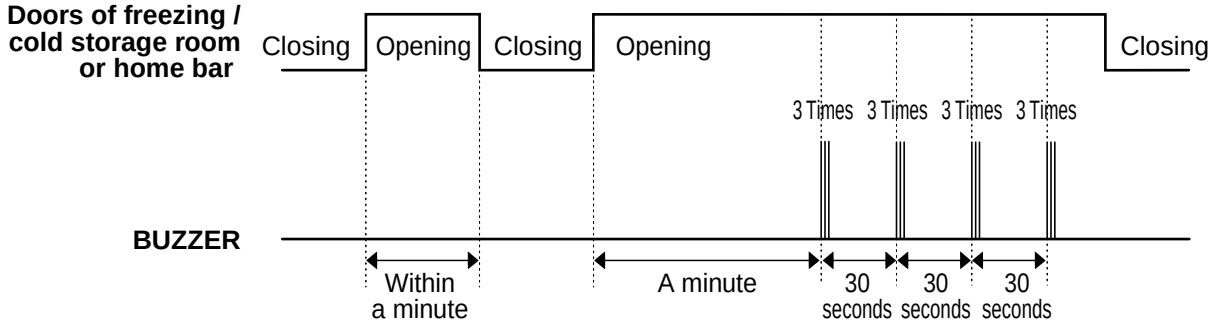
1. To increase cooling speed and load response speed, MICOM variably controls freezing room fan motor at the high speed of RPM and standard RPM.
2. MICOM only operates in the input of initial power or special freezing operation or load response operation for the high speed of RPM and operates in the standard RPM in other general operation.
3. If opening doors of freezing / cold storage room or home bar while fan motor in the freezing room operates, the freezing room fan motor normally operates (If being operated in the high speed of RPM, it converts operation to the standard RPM). However, if opening doors of freezing room or home bar, the freezing room fan motor stops.
4. As for monitoring of BLDC fan motor error in the freezing room, MICOM immediately stops the fan motor by determining that the BLDC fan motor is locked or poor if there would be position signal for more than 65 seconds at the BLDC motor. Then it displays failure (refer to failure diagnosis function table) at the display part of refrigerator, performs re-operation in the cycle of 30 minutes. If normal operation is performed, poor status is released and refrigerator returns to the initial status (reset).

2-6. Control of M/C room fan motor

1. The M/C room fan motor performs ON/OFF control by linking with the COMP.
2. It controls at the single RPM without varying RPM.
3. Failure sensing method is same as in fan motor of freezing fan motor (refer to failure diagnosis function table for failure display).

2-7. Door opening alarm

1. Buzzer generates alarm sound if doors are not closed even when more than a minute consecutively has passed with doors of freezing / cold storage room or home bar opened.
2. Buzzer rings three times in the interval of 0.5 second after the first one-minute has passed after doors are opened and then repeats three times of On/Off alarm in the cycle of every 30 seconds.
3. If all the doors of freezing / cold storage room or home bar are closed during door open alarm, alarm is immediately released.



2-8. Ringing of button selection buzzer

1. If pressing the front display button, “Ding ~ “ sound rings.

2-9. Ringing of compulsory operation, compulsory frost removal buzzer

1. If pressing the test button in the main PCB, “Phi ~ “ sound rings.
2. In selecting compulsory operation, alarm sound is repeated and completed in the cycle of On for 0.2 second and Off for 1.8 second three times.
3. In selecting compulsory frost removal, alarm sound is repeated and completed in the cycle of On for 0.2 second , Off for 0.2 second, On for 0.2 second and Off for 1.4 second three times.

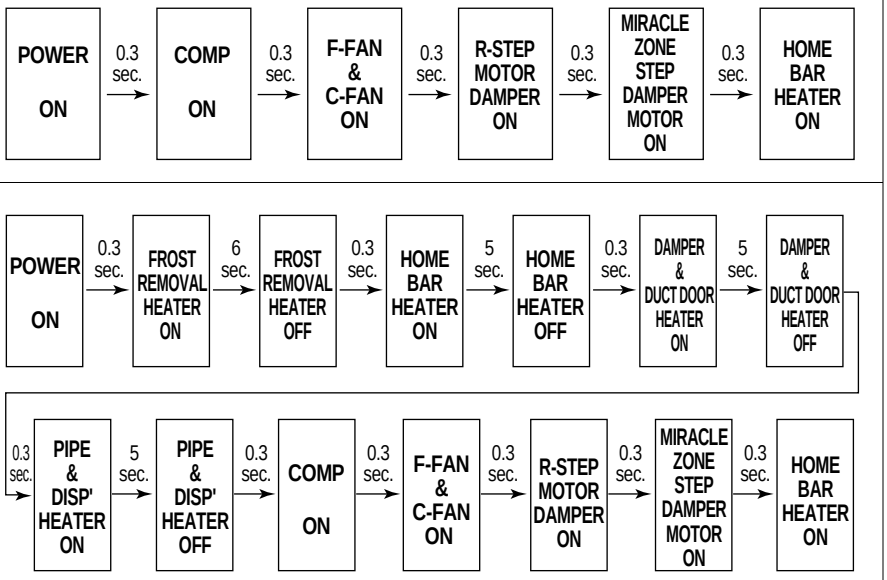
MICOM FUNCTION

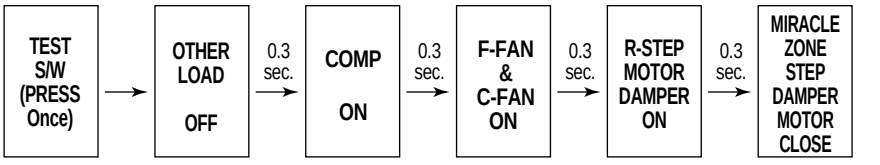
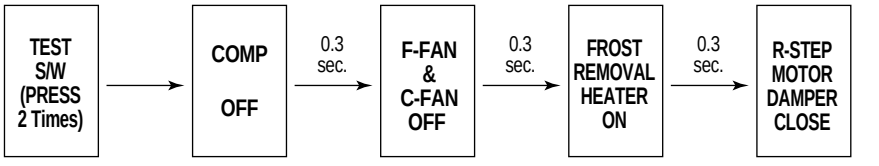
2-10. Frost removal function

1. Frost removal is performed whenever total operation time of compressor becomes 7 ~ 7.5 hour.
2. In providing initial power (or returning power failure), frost removal starts whenever total operation time of compressor becomes 4 ~ 4.5 hour.
3. Frost removal is completed if temperature of a frost removal sensor becomes more than 5°C after starting frost removal. Poor frost removal is not displaced if it does not arrive at 5°C even if two hours have passed after starting frost removal.
4. No removal is done if frost removal sensor becomes poor (snapping or short-circuit).

2-11. Sequential operation of built-in product

Built-in products such as compressor, frost removal heater, freezing room fan, Cooling Fan and step motor damper are sequentially operated as follows for preventing noise and part damage occurred due to simultaneous operation of a lot of parts in applying initial power and completing test.

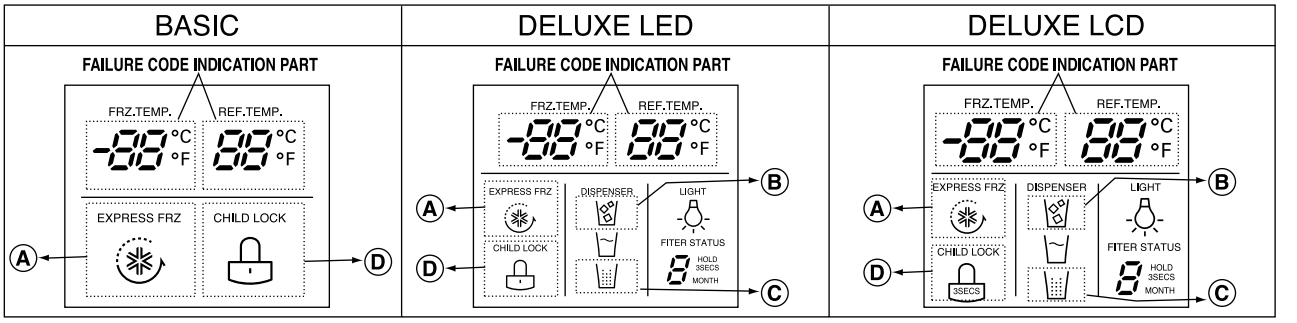
<table>
<tr><th colspan="2">Function</th><th>Load Operation Sequence</th><th>Remark</th></tr>
<tr><td rowspan="2">In applying Initial power</td><td>When temperature of a frost removal sensor becomes more than 45°C (In purchase, movement)</td><td rowspan="2"> 
</td><td rowspan="2">If error occurs during operation, initial operation is not done.

■ Sequence of load operation when closing F-room and R-room.</td></tr>
<tr><td>When temperature of a frost removal sensor becomes less than 45°C (In power failure, service)</td></tr>
<tr><td rowspan="2">TEST MODE</td><td>Test mode 1 (Compulsory function)</td><td> 
</td><td rowspan="2">If pressing switch once more in the test mode 2 or temperature of a frost removal sensor is more than 5°C, it immediately returns to the test mode for initial operation (COMP operates after 7 minutes).</td></tr>
<tr><td>Test mode 2 (Compulsory frost removal)</td><td> 
</td></tr>
</table>

MICOM FUNCTION

2-12. Function of Trouble Diagnosis(88-LED)

1. Failure diagnosis function is function to facilitate service when nonconforming matters affecting performance of product during use of product.
2. In occurrence of failure, pressing the function adjustment button does not perform function and only alarm sound (“Ding~”) rings.
3. If nonconforming matters occurred are released during display of failure code, MICOM returns to the original state (Reset).
4. Failure code is displayed on the display part of setting temperature for the freezing room and the display part of setting temperature for the cold storage room of LED, which are placed at the display part of a refrigerator. All the LED graphics other than a failure code are turned off.



○ : PROPER OPERATION

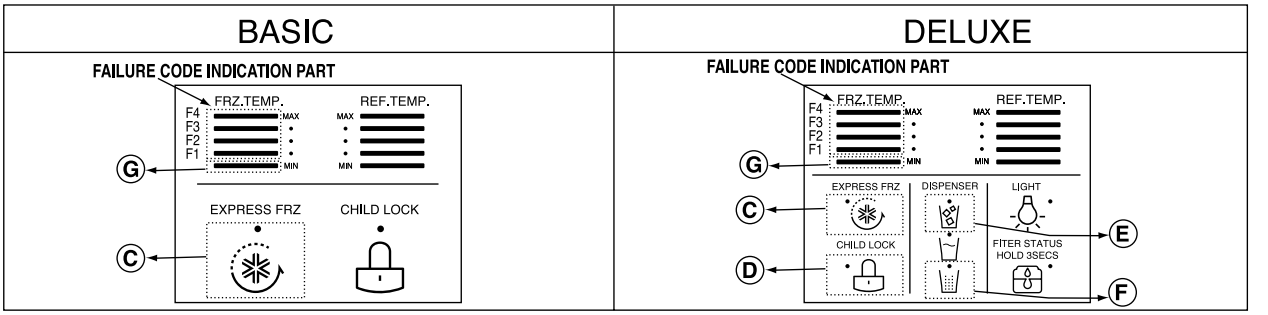
NO	ITEM	FAILURE CODE INDICATION PART		CONTENTS OF FAILURE	PRODUCT OPERATION STATUS IN FAILURE				
		FREEZER ROOM NOTCH TEMPERATURE DISPLAY	REFRIGERATOR ROOM NOTCH TEMPERATURE DISPLAY		COMPRESSOR	FREEZING BLDC MOTOR	COOLING BLDC MOTOR	DEFROST HEATER	STEPPING MOTOR DAMPTER
1	ABNORMAL FREEZER SENSOR	Er	FS	FREEZER SENSOR SHORT CIRCUIT	ON FOR 15 MINUTES / OFF FOR 15 MINUTES	STANDARD RPM	○	○	○
2	ABNORMAL REFRIGERATOR SENSOR1(R1) (UPPER PART IN THE REFRIGERATOR COMPARTMENT)	Er	rS	REFRIGERATOR SENSOR1 SHORT CIRCUIT	○	STANDARD RPM	○	○	FULL OPENING FOR 10 MINUTES/ FULL CLOSING FOR 15 MINUTES
3	ABNORMAL REFRIGERATOR SENSOR2(R2) (LOWER PART IN THE REFRIGERATOR COMPARTMENT)	NORMAL DISPLAY (NOTE2)		REFRIGERATOR SENSOR2 SHORT CIRCUIT	○	STANDARD RPM	○	○	○
4	ABNORMAL DEFROST SENSOR	Er	dS	ABNORMAL SHORT CIRCUIT	○	STANDARD RPM	○	NO DEFROST	○
5	FAILED DEFROSTING	Er	dH	DEFROST HEATER, TEMPERATURE FUSE SHORT CIRCUIT,UNPLUGGED CONNECTOR(INDICATED 4 HOUR LATER AFTER TROUBLE)	○	STANDARD RPM	○	○	○
6	ABNORMAL FREEZING BLDC MOTOR	Er	FF	MOTOR DEFECT, HOOKED OF LEAD WIRE TO FAN, CONTACT OF STRUCTURES WITH FAN, SHORT OR OPEN OF LEAD WIRE(THERE IS NO SIGNAL OF BLDC MOTOR MORE THAN 115 SECONDS IN OPERATION OF FAN MOTOR)	○	OFF	○	○	○
7	ABNORMAL COOLING BLDC MOTOR	Er	CF		○	STANDARD RPM	OFF	○	○
8	ABNORMAL COMMUNICATION	Er	CO	SHORT OR OPEN OF LEAD WIRE CONNECTING BETWEEN MAIN PCB AND DISPLAY PCB, TRANSMISSION TR AND RECEIVING PART	○	STANDARD RPM	○	○	○
9	ABNORMAL AMBIENT SENSOR	NORMAL DISPLAY (NOTE1)		AMBIENT SENSOR SHORT CIRCUIT	○	○	○	○	○
10	ABNORMAL ICE-MAKER SENSOR	NORMAL DISPLAY (NOTE2)		ICE-MAKER SENSOR SHORT CIRCUIT	○	○	○	○	○
11	ABNORMAL ICE-MAKER UNIT	NORMAL DISPLAY (NOTE2)		FAULTY ICE-MAKER UNIT MOTOR OR HALL IC, LEAD WIRE SHORT CIRCUIT, FAULTY MOTOR DRIVING CIRCUIT	○	○	○	○	○

✻ In display of the failure mode, all LEDs of setting temperature for freezing/ setting temperature for cold storage are turned off (excluding Note1 and Note2).

MICOM FUNCTION

2-13. Function of Trouble Diagnosis(Bar-LED)

1. Function of trouble diagnosis is to make the repair service easy when the refrigerator is out of order during service.
2. The function control button does not work but the recognition sound is heard when the refrigerator is out of order.
3. It returns to normal conditions when trouble code led is off. (reset)
4. Trouble code is indicated by the freezing temperature indicator led in the refrigerator display. All leds except trouble code are off.



-☼- : On ● : Off ○ : PROPER OPERATION

NO	ITEM	TROUBLE CODE INDEX	CONTENTS OF FAILURE	PRODUCT OPERATION STATUS IN FAILURE				
		F1 F2 F3 F4		COMPRESSOR	FREEZING BLDC MOTOR	COOLING BLDC MOTOR	DEFROST HEATER	STEPPING MOTOR DAMPTER
1	ABNORMAL FREEZER SENSOR	-☼- ● ● ●	FREEZER SENSOR SHORT CIRCUIT	ON FOR 15 MINUTES / OFF FOR 15 MINUTES	STANDARD RPM	○	○	○
2	ABNORMAL REFRIGERATOR SENSOR1(R1) (UPPER PART IN THE REFRIGERATOR COMPARTMENT)	● -☼- ● ●	REFRIGERATOR SENSOR1 SHORT CIRCUIT	○	STANDARD RPM	○	○	FULL OPENING FOR 10 MINUTES/ FULL CLOSING FOR 15 MINUTES
3	ABNORMAL REFRIGERATOR SENSOR2(R2) (LOWER PART IN THE REFRIGERATOR COMPARTMENT)	NORMAL DISPLAY (NOTE 1)	REFRIGERATOR SENSOR2 SHORT CIRCUIT	○	STANDARD RPM	○	○	○
4	ABNORMAL DEFROST SENSOR	● ● -☼- ●	ABNORMAL SHORT CIRCUIT	○	STANDARD RPM	○	NO DEFROST	○
5	FAILED DEFROSTING	-☼- -☼- -☼- -☼-	DEFROST HEATER, TEMPERATURE FUSE SHORT CIRCUIT, UNPLUGGED CONNECTOR (INDICATED 4 HOUR LATER AFTER TROUBLE)	○	STANDARD RPM	○	○	○
6	ABNORMAL FREEZING BLDC MOTOR	-☼- ● ● -☼-	MOTOR DEFECT, HOOKED OF LEAD WIRE TO FAN, CONTACT OF STRUCTURES WITH FAN, SHORT OR OPEN OF LEAD WIRE (THERE IS NO SIGNAL OF BLDC MOTOR MORE THAN 65 SECONDS IN OPERATION OF FAN MOTOR)	○	OFF	○	○	○
7	ABNORMAL COOLING BLDC MOTOR	-☼- -☼- ● ●		○	STANDARD RPM	OFF	○	○
8	ABNORMAL AMBIENT SENSOR	NORMAL DISPLAY (NOTE 1)	AMBIENT SENSOR SHORT CIRCUIT	○	○	○	○	○
9	ABNORMAL ICE-MAKER SENSOR	NORMAL DISPLAY (NOTE 1)	ICE-MAKER SENSOR SHORT CIRCUIT	○	○	○	○	○
10	ABNORMAL ICE-MAKER UNIT	NORMAL DISPLAY (NOTE 1)	FAULTY ICE-MAKER UNIT MOTOR OR HALL IC, LEAD WIRE SHORT CIRCUIT, FAULTY MOTOR DRIVING CIRCUIT	○	○	○	○	○
11	ABNORMAL W/T SENSOR	NORMAL DISPLAY (NOTE 1)	WATER TANK SENSOR SHORT CIRCUIT	○	○	○	○	○

MICOM FUNCTION

Function of Trouble Diagnosis(88LED)

NOTE1) IN CASE OF ABNORMAL AMBIENT SENSOR,"Er", "rt" INDICATED ON THE FAILURE CODE INDICATION PART.(OTHER DISPLAY PARTS ARE INDICATED NORMALLY)
NOTE 2) R2-SENSOR, ICE-MAKER SENSOR,MIRACLE ZONE SENSOR, WATER-TANK SENSOR AND ICE-MAKER UNIT IS NOT INDICATED ON THE FAILURE INDICATING PART BUT INDICATED IN CHECKING DISPLAY PART. (WHEN PRESSING FOR MORE THAN THE BUTTON OF FREEZING TEMPERATURE AND EXPRESS FREEZING BUTTON FOR MORE THAN 1 SECOND)

- R2-SENSOR(MIDDLE ROOM)
  - NORMAL : DISPLAY GRAPHIC ON THE Ⓐ PART TURNS ON
  - ABNORMAL : DISPLAY GRAPHIC ON THE Ⓐ PART TURNS OFF
- ICE-MAKER SENSOR
  - NORMAL : DISPLAY GRAPHIC ON THE Ⓑ PART TURNS ON
  - ABNORMAL : DISPLAY GRAPHIC ON THE Ⓑ PART TURNS OFF
- ICE-MAKER UNIT
  - NORMAL : DISPLAY GRAPHIC ON THE Ⓒ PART TURNS ON
  - ABNORMAL : DISPLAY GRAPHIC ON THE Ⓒ PART TURNS OFF
- MIRACLE ZONE SENSOR /WATER-TANK SENSOR
  - NORMAL : DISPLAY GRAPHIC ON THE Ⓓ PART TURNS ON
  - ABNORMAL : DISPLAY GRAPHIC ON THE Ⓓ PART TURNS OFF

THE OTHER DISPLAY GRAPHICS TURN ON

2-14. Test Function

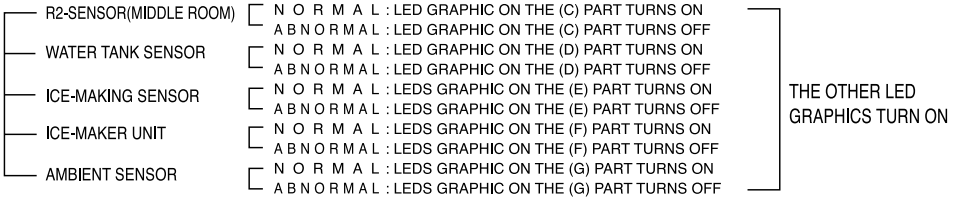
1. The purpose of test function is to check function of the PWB and product and to search for the failure part at the failure status.
2. Test button is placed on the main PCB of refrigerator (test switch), and the test mode will be finished after maximum 2 hours irrespective of test mode and then is reset to the normal status.
3. Function adjustment button is not perceived during performance of test mode but only warning sounds ring.
4. In finishing test mode, always pull the power cord out and then plug-in it again for the normal state.
5. If nonconforming contents such as sensor failure are found during performance of test mode, release the test mode and display the failure code.
6. Even if pressing the test button during failure code display, test mode will not be performed.

MODE	OPERATION	CONTENTS	REMARKS
TEST1	PRESS TEST BUTTON ONCE <STRONG COLD MODE>	1. CONTINUOUS OPERATION OF COMPRESSOR 2. CONTINUOUS OPERATION OF FREEZING BLDC MOTOR (HIGH-SPEED RPM) AND COOLING BLDC MOTOR 3. DEFROST HEATER TURNS OFF 4. STEPPING MOTOR DAMPER IS COMPLETELY OPENED (OPEN OF BAFFLE) 5. ALL DISPLAY GRAPHICS TURNS ON	FREEZING FAN TURNS OFF IN DOOR OPENING
TEST2	PRESS TEST BUTTON ONCE AT THE TEST MODE 1 STATUS <FORCED DEFROST MODE>	1. COMPRESSOR OFF 2. FREEZING BLDC MOTOR AND COOLING BLDC MOTOR TURN OFF 3. DEFROST HEATER TURNS ON 4. STEPPING MOTOR DAMPER IS COMPLETELY CLOSED(CLOSING OF BAFFLE) 5. ALL DISPLAY GRAPHICS TURNS OFF(ONLY FAILURE CODE INDICATION PART TURNS ON "22" STATUS)	RETURN TO THE NORMAL MODE WHEN THE DEFROST SENSOR IS ABOVE +5°C
NORMAL STATUS	PRESS TEST BUTTON ONCE AT THE TEST MODE 2 STATUS	RETURNING TO INITIAL STATUS	COMPERSSOR WILL OPERATE AFTER DELAY FOR 7 MINUTES

MICOM FUNCTION

Function of Trouble Diagnosis(BAR LED)

NOTE 1) R2-SENSOR, WATER TANK SENSOR, ICE MAKER-SENSOR, ICE MAKER UNIT AND AMBIENT SENSOR ARE NOT INDICATED ON THE FARILURE INDICATING PART BUT INDICATED IN CHECHKING DISPLAY (WHEN PRESSING THE BUTTON OF FREEZING TEMPERATURE AND EXPRESS FREEZER BUTTON FOR MORE THAN 1 SECOND).


R2-SENSOR(MIDDLE ROOM)
N O R M A L : LED GRAPHIC ON THE (C) PART TURNS ON
A B N O R M A L : LED GRAPHIC ON THE (C) PART TURNS OFF
WATER TANK SENSOR
N O R M A L : LED GRAPHIC ON THE (D) PART TURNS ON
A B N O R M A L : LED GRAPHIC ON THE (D) PART TURNS OFF
ICE-MAKING SENSOR
N O R M A L : LEDS GRAPHIC ON THE (E) PART TURNS ON
A B N O R M A L : LEDS GRAPHIC ON THE (E) PART TURNS OFF
ICE-MAKER UNIT
N O R M A L : LEDS GRAPHIC ON THE (F) PART TURNS ON
A B N O R M A L : LEDS GRAPHIC ON THE (F) PART TURNS OFF
AMBIENT SENSOR
N O R M A L : LEDS GRAPHIC ON THE (G) PART TURNS ON
A B N O R M A L : LEDS GRAPHIC ON THE (G) PART TURNS OFF
THE OTHER LED GRAPHICS TURN ON

2-15. Test Function

1. The purpose of test function is to check function of the PWB and product and to search for the failure part at the failure status.
2. Test button is placed on the main PCB of refrigerator (test switch), and the test mode will be finished after maximum 2 hours irrespective of test mode and then is reset to the normal status.
3. Function adjustment button is not perceived during performance of test mode but only warning sounds ring.
4. In finishing test mode, always pull the power cord out and then plug-in it again for the normal state.
5. If nonconforming contents such as sensor failure are found during performance of test mode, release the test mode and display the failure code.
6. Even if pressing the test button during failure code display, test mode will not be performed.

MODE	OPERATION	CONTENTS	REMARKS
TEST1	PRESS TEST BUTTON ONCE (STRONG COLD MODE)	1. CONTINUOUS OPERATION OF COMPRESSOR 2. CONTINUOUS OPERATION OF FREEZING BLDC MOTOR (HIGH-SPEED RPM) AND COOLING BLDC MOTOR 3. DEFROST HEATER TURNS OFF 4. STEPPING MOTOR DAMPER IS COMPLETELY OPENED (OPEN OF BAFFLE) 5. ALL DISPLAY LEDS GRAPHICS TURN ON.	FREEZING FAN TURNS OFF IN DOOR OPENING
TEST2	PRESS TEST BUTTON ONCE AT THE TEST MODE 1 STATUS (FORCED DEFROST MODE)	1. COMPRESSOR OFF 2. FREEZING BLDC MOTOR AND COOLING BLDC MOTOR TURN OFF 3. DEFROST HEATER TURNS ON 4. STEPPING MOTOR DAMPER IS COMPLETELY CLOSED (CLOSING OF BAFFLE) 5. ALL DISPLAY LEDS GRAPHICS TURN OFF. EXCEPT FOR FRZ TEMP, REF TEMP MIDDLE NOTCH LED	RETURN TO THE NORMAL MODE WHEN THE DEFROST SENSOR IS ABOVE +5°C
NORMAL STATUS	PRESS TEST BUTTON ONCE AT THE TEST MODE 2 STATUS	RETURNING TO INITIAL STATUS	COMPERSSOR WILL OPERATE AFTER DELAY FOR 7 MINUTES

MICOM FUNCTION

* LED check function- When freezer and refrigerator temperature control buttons are pressed for more than 1 second at the same time, all LEDS on the display are on. And it returns to the normal conditions when the buttons are released.
* Check of freezer fan rpm variation- Freezer fan speed changes from high speed to standard speed and vice versa for 30 seconds whenever freezer and refrigerator temperature control buttons are pressed at the same time for more than 1 second when freezer fan is in operation and returns to the previous rpm.

2-16. Functions of Ice Dispenser and Water Dispenser

1. Ice and cold water are available without opening refrigerator door.

2. The desired ice (crushed or cube) or cold water are dispensed when dispenser press button (rubber button) is pressed after selection of ice or cold water. When ice is selected, duct door opens by electric solenoid when dispenser press switch is pressed. When dispenser press switch is released, duct door closes after it opens for 5 seconds.

3. Ice and water dispensing function stops when freezer door is open.

4. Geared motor and solenoid are automatically off if there is no signal after 3 minutes when ice (crushed and cube) or water is selected and dispenser switch is pressed down. Solenoid (duct door) stops after 5 seconds when solenoid is off. (in order to protect short circuit from solenoid heat generation)

5. Dispenser Lamp On/Off Function. The dispenser lamp shall be on or off whenever dispenser button is pressed or released, respectively after selection of ice (crushed or cube) or water.

6. Water/Crushed Ice/Cube Ice Selection function
   1) It is to select water/crushed ice/cube ice by user from the function control part and it will be indicated and selected by pressing button.
   2) Crushed ice is automatically selected when power is initially on.
   3) When crushed ice is selected and its button is pressed, geared motor operates and crushed ice is dispensed.
   4) When cube ice is selected and its button is pressed, geared motor and ice solenoid operate and cube ice is dispensed.

7. Function of Water Dispenser
   1) When user selects water in the function control parts, it is indicated in the LED and water is selected.
   2) Water dispenser is a direct tap water connection type. The water solenoid valve on the right of machine room opens and water dispenses when user selects water and presses button.

EXPLATION FOR MICOM CIRCUIT

1. Explanation for PWB circuit

1-1. Power circuit

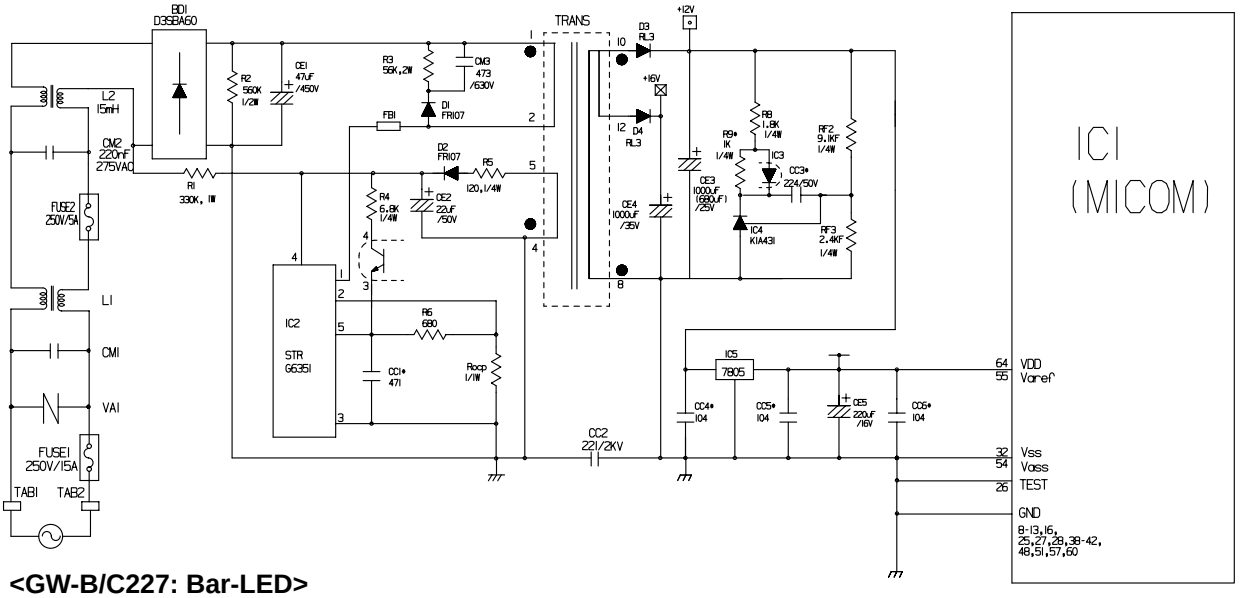
Power circuit consists of SMPS (SWITCHING MODE POWER SUPPLY) power. The SMPS consist of the rectifying part (BD1, CE1) converting AC voltage to DC voltage, the switching part (IC2) switching the converted DC voltage, transformer transferring energy of the primary side of the switching terminal to the secondary side and the feedback part (IC3, IC4) transferring it to the primary side.

Caution : Since high voltage (DC310V) is maintained at the power terminal, please take a measure after more than 3 minutes have passed after removing power cords in the abnormal operation of a circuit.

Voltage of every part is as follows:

Part	VA1	CE1	CE2	CE3	CE4	CE5
Voltage	230 Vac	inspection Vdc	13~16 Vdc	12 Vdc	15.5 Vdc	5 Vdc

<GW-B/C227: 88-LED>



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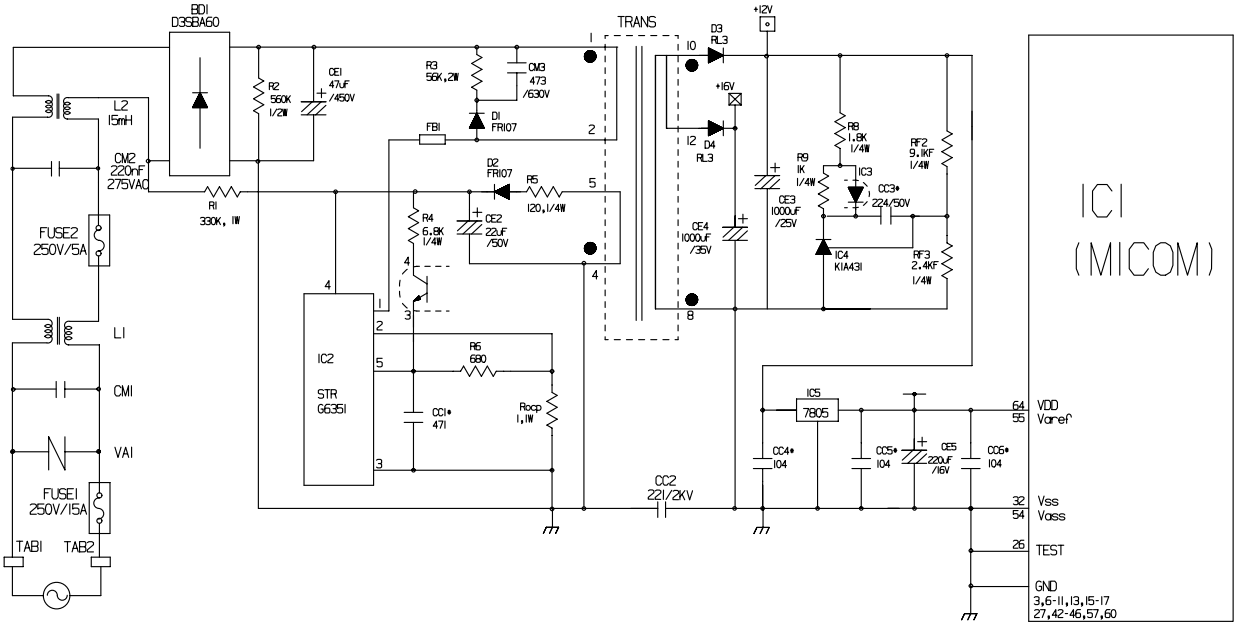

EXPLATION FOR MICOM CIRCUIT

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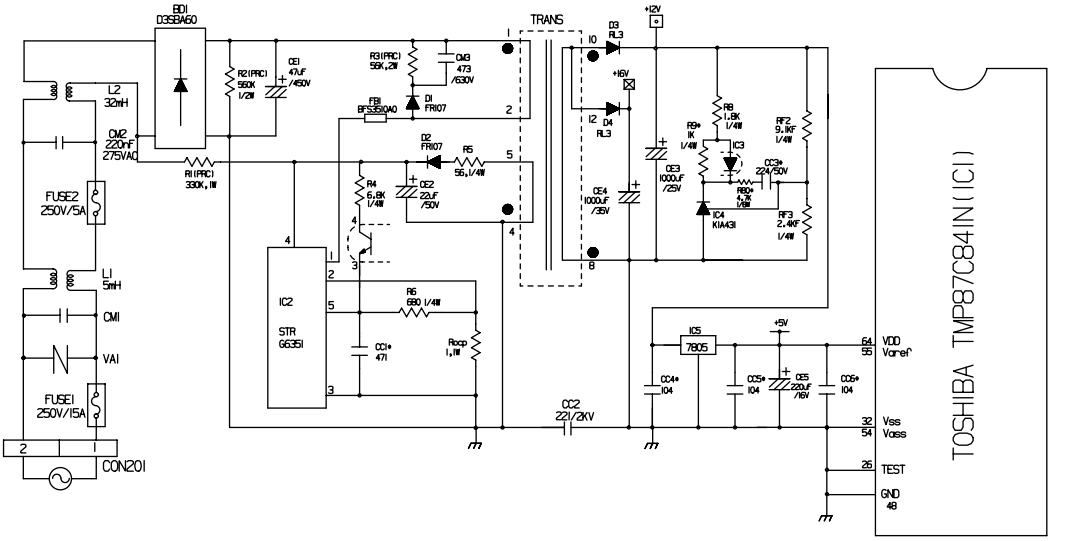

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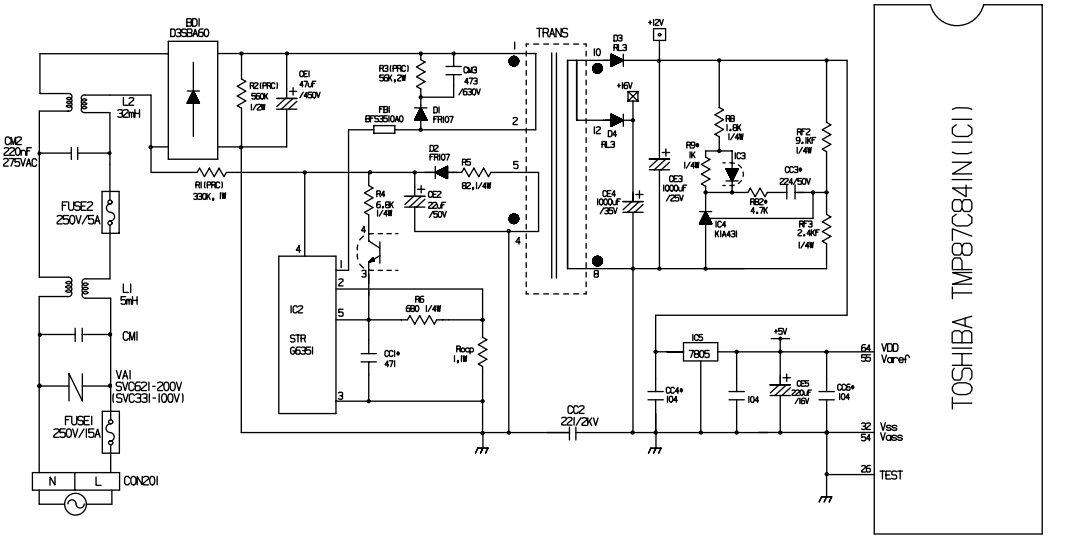

EXPLATION FOR MICOM CIRCUIT

1-2. Oscillation circuit

Oscillation circuit is a circuit with the purpose of generating basic time for clock occurrence for synchronization and time calculation in relation with information transmission/reception of inside elements of IC1 (MICOM). The OSC1 must always use rated parts since if SPEC is changed, time calculated at the IC1 may be changed or no operation is done.

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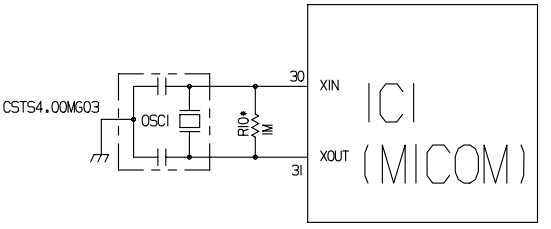

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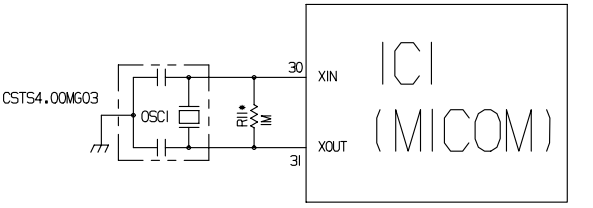

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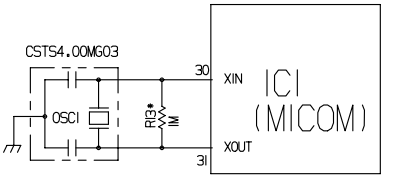

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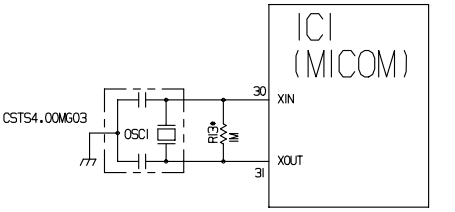
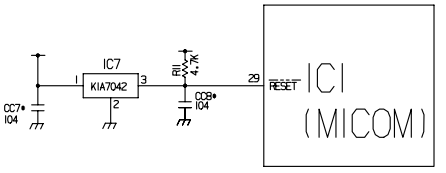


1-3. Reset circuit

The reset circuit is circuit allowing various parts such as RAM inside of MICOM (IC1) to initialize and the whole of function to start from the initial status, when initial power is input or when power is applied again to MICOM by a spontaneous power failure. ‘LOW’ voltage is applied to the reset terminal of MICOM in the beginning of power supply for a constant time (10ms). Reset terminal during general operation is 5V (No MICOM operates in failure of RESET IC).

<GW-B/C227: 88-LED>



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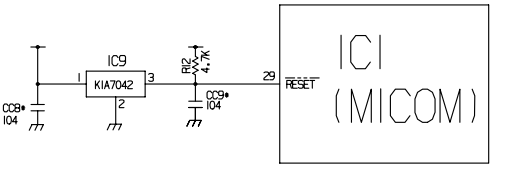

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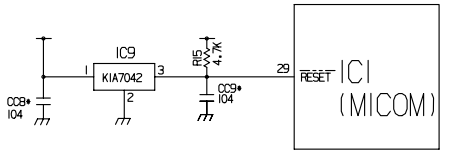

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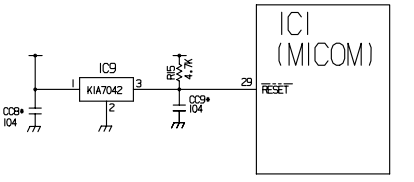


EXPLATION FOR MICOM CIRCUIT

1-4. Load/dispenser operation, buzzer driving, door opening circuit

1. LOAD DRIVING CIRCUIT

✻ InEven if opening the door of freezing room or cold storage room during operation of fan motor at the freezing room, this circuit does not stop and operates at the standard RPM. In addition, if doors of freezing room or cold storage room, the fan motor normally operates at the RPM previously operated.

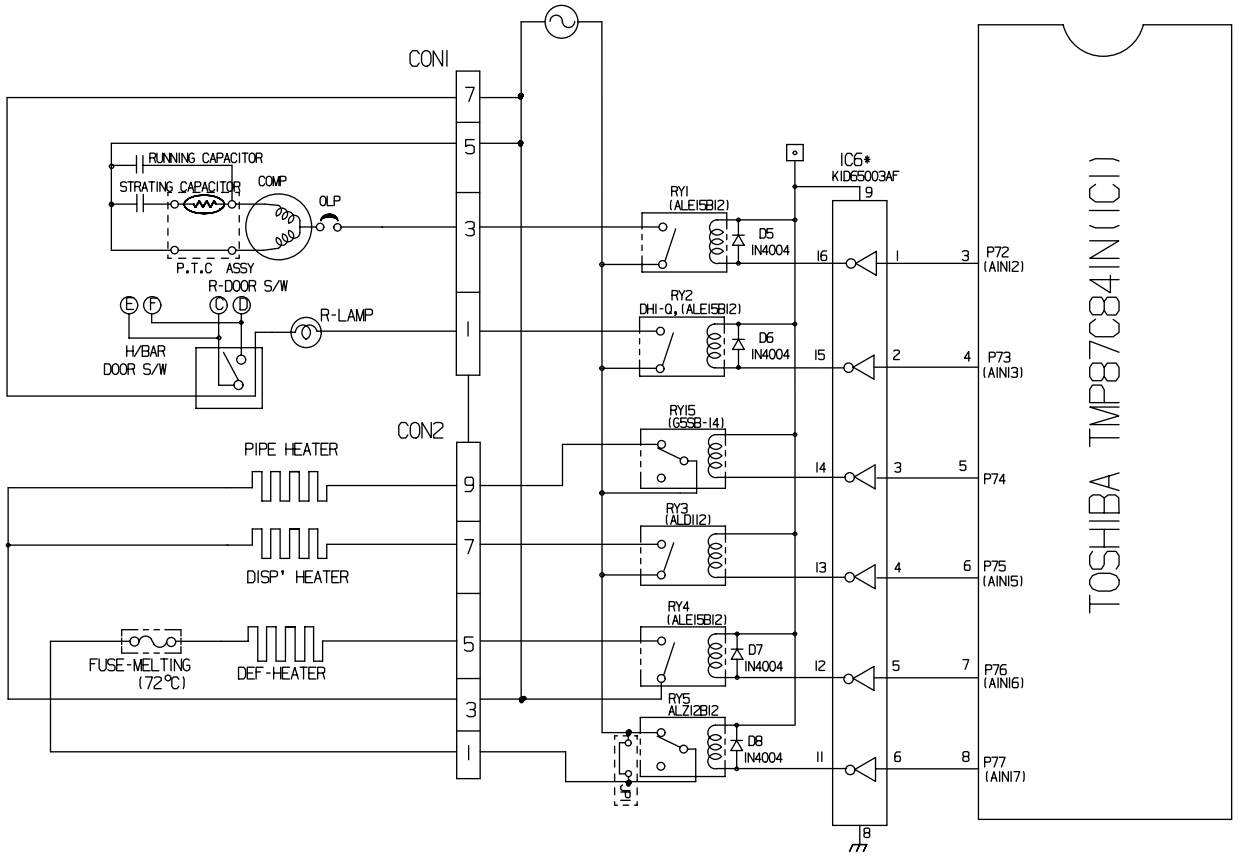
✻ (A), (B), (C) and (D) of door switch for the freezing room or cold storage room are connected to the door open sensing circuit in parallel toward both ends of switch to determine door open at MICOM.

✻ Since a door switch of the home bar is connected to door switch (C), (D) of the cold storage room, it senses door opening if even one of both is opened.

✻ The fan motor is immediately stop if opening doors of the freezing room or cold storage room at the TEST mode and it immediately operates if closing them.

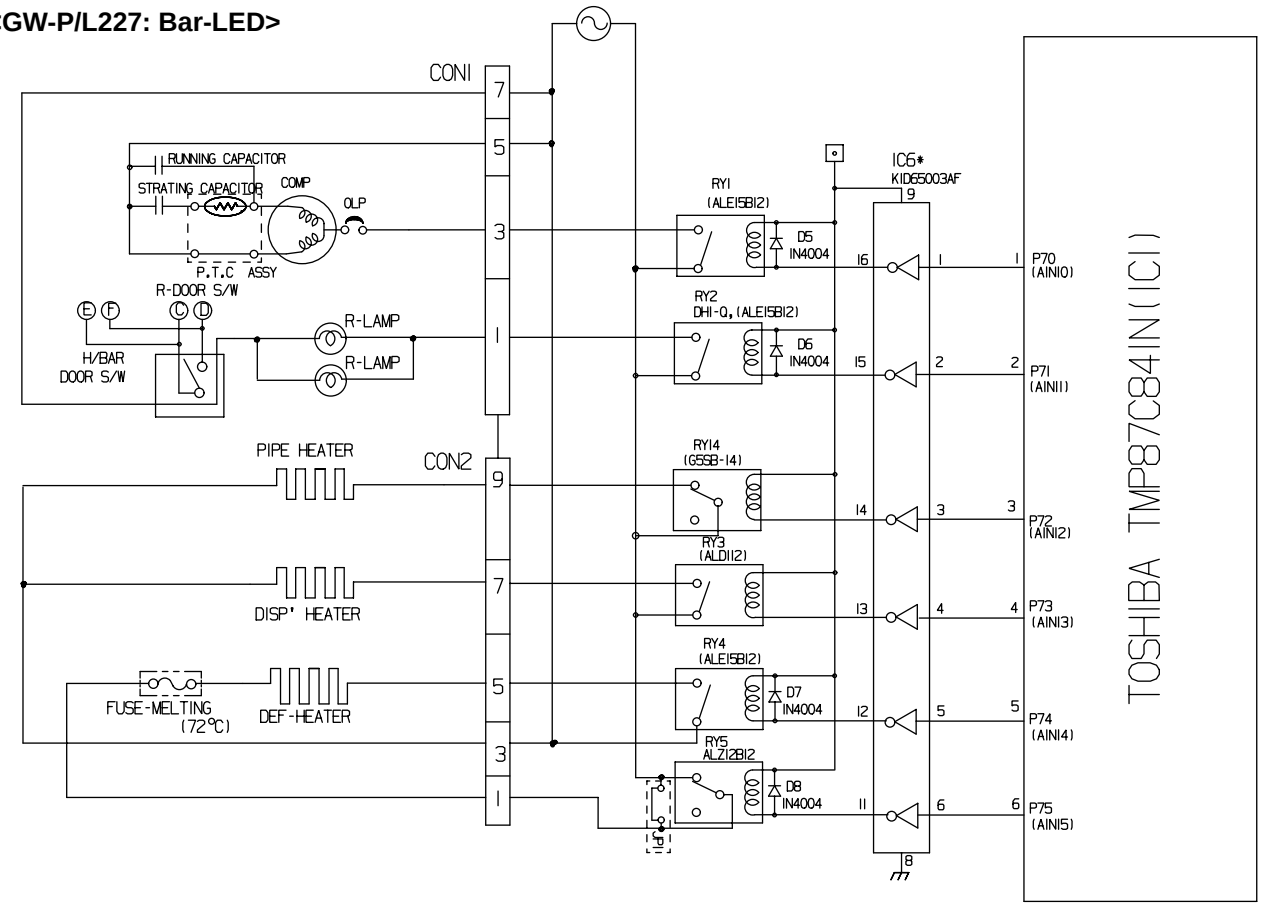
Type of Load		COMP	Frost Removal Heater	AC Converting Relay	R-room LAMP	Dispenser Heater	Pipe Heater
Measuring part (IC6)		No.16	No.12	No.11	No.15	No.13	No.14
Status	ON	Within 1 V					
	OFF	12 V					

<GW-P/L227: 88-LED>



EXPLATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>



EXPLATION FOR MICOM CIRCUIT

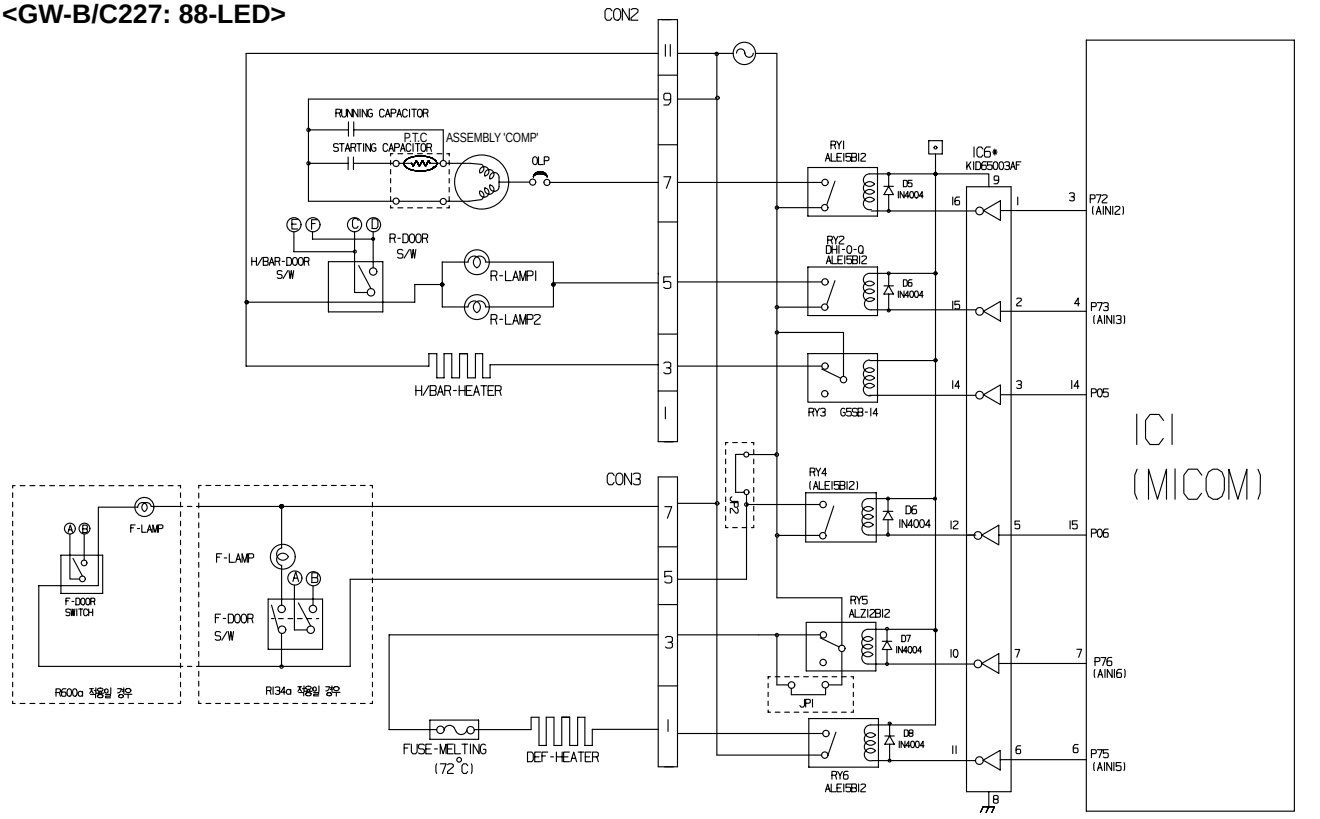
✻ The fan motor at the freezing room does not stop but operates if opening doors of the freezing room or cold storage room or the home bar during operation of the fan motor at the freezing room.

✻ (A), (B), (C) and (D) of door switch for the freezing room or cold storage room are connected to the door open sensing circuit toward both ends of switch to determine door open at MICOM.

✻ Since a door switch of the home bar is connected to door switch (C), (D) of the cold storage room, it senses door opening if even one of both is opened.

Type of Load		COMP	Frost Removal Heater	AC Converting Relay	R-room LAMP	Homebar Heater
Measuring part (IC6)		No.16	No.11	No.10	No.15	No.14
Status	ON	Within 1 V				
	OFF	12 V				

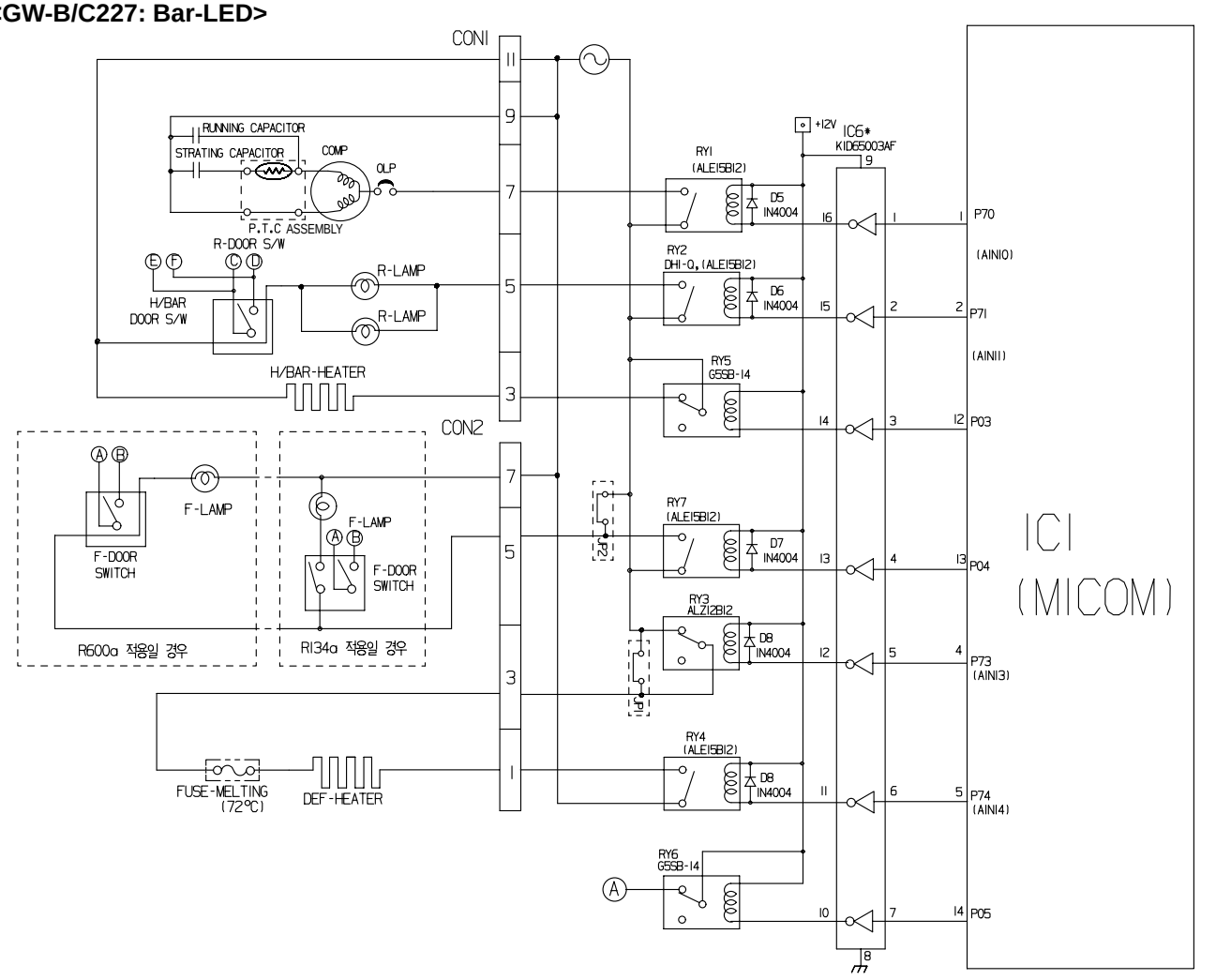
<GW-B/C227: 88-LED>



EXPLATION FOR MICOM CIRCUIT

Type of Load		COMP	Frost Removal Heater	AC Converting Relay	R-room LAMP	Homebar Heater
Measuring part (IC6)		No.16	No.11	No.12	No.15	No.14
Status	ON	Within 1 V				
	OFF	12 V				

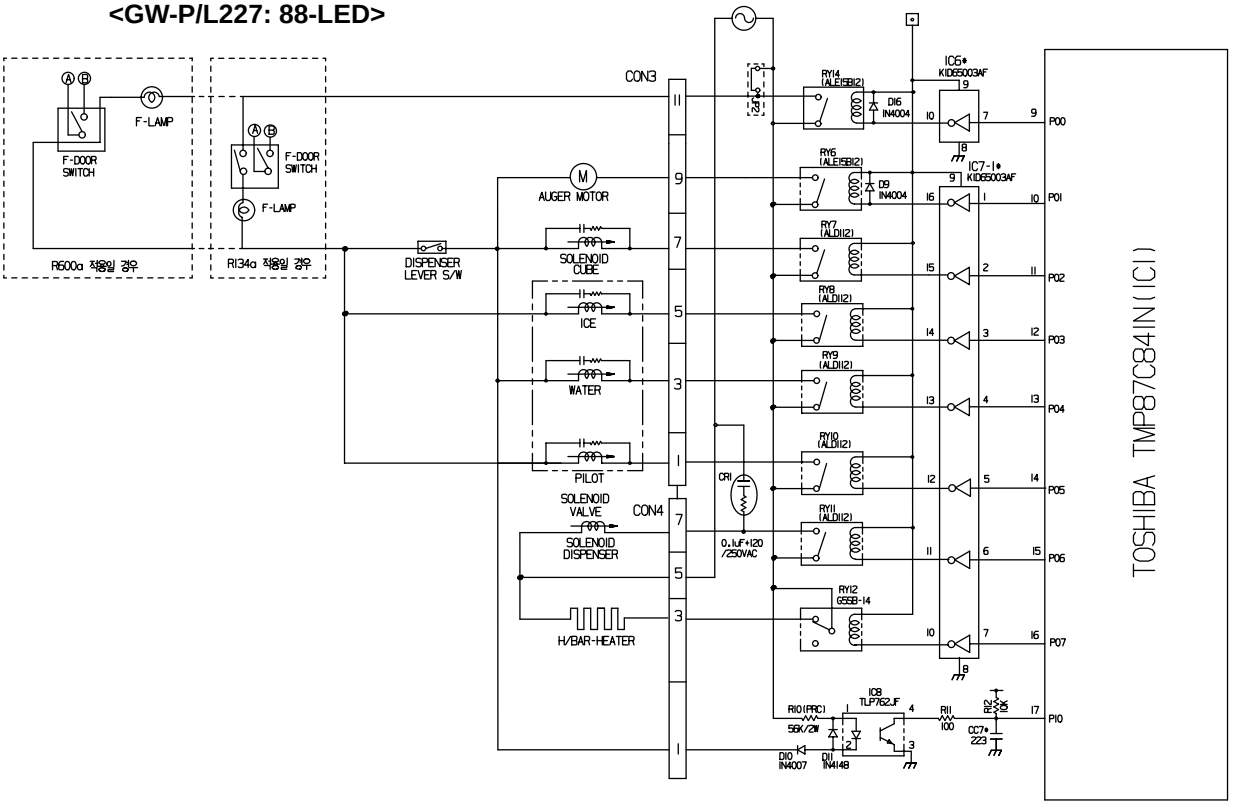
<GW-B/C227: Bar-LED>



EXPLATION FOR MICOM CIRCUIT

2. Dispenser operation circuit

<GW-P/L227: 88-LED>



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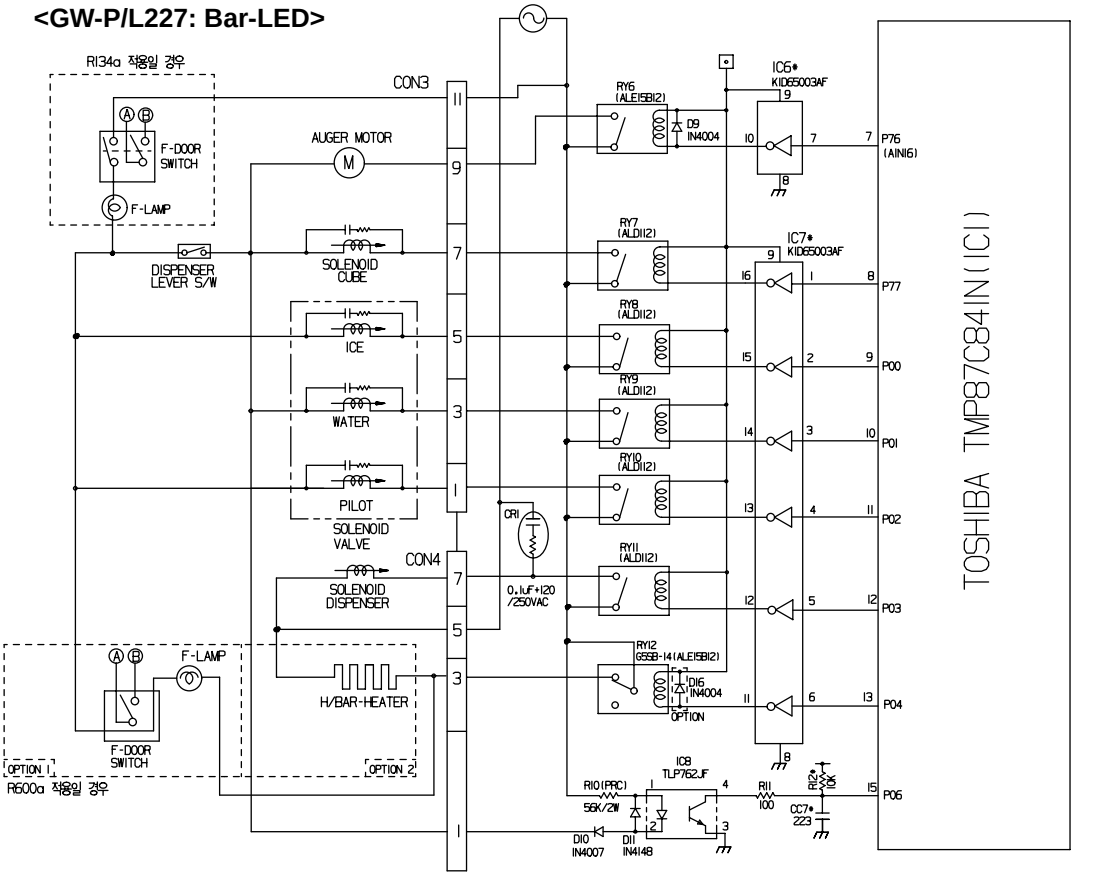
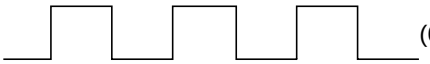


EXPLATION FOR MICOM CIRCUIT

1) Check load driving status

Type of Load		GEARED MOTOR	SOLENOID CUBE	WATER VALVE		PILOT VALVE	SOLENOID DISPENSER	HOME BAR HEATER
				ICE	WATER			
Measuring part		IC7-No.16	IC7-No.15	IC7-No.14	IC7-No.13	IC7-No.12	IC7-No.11	IC7-No.10
Status	ON	Within 1 V						
	OFF	12 V						

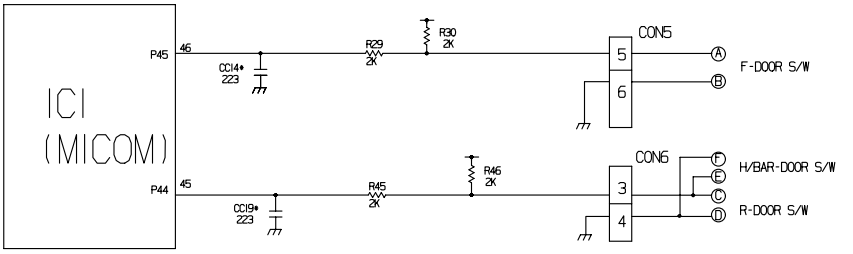
2) Lever S/W sensing circuit

Measuring part / Lever S/W	IC1(Micom) No.15 (16)
On(Press)	5 V 0 V  (60 Hz)
OFF	5V

EXPLATION FOR MICOM CIRCUIT

3. Door opening sensing circuit

<GW-B/C227: 88-LED>



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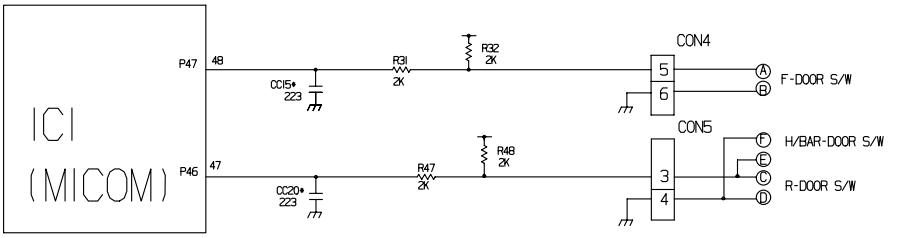

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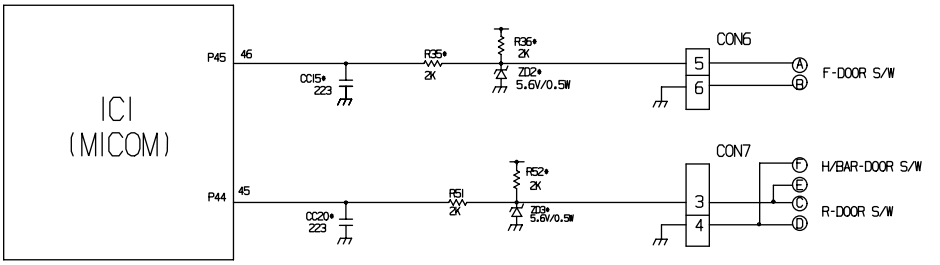

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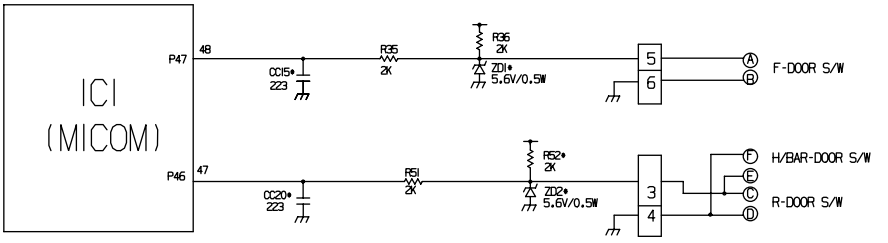
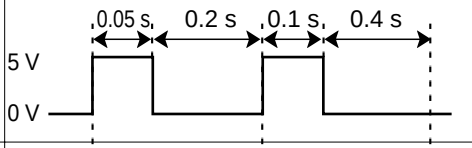
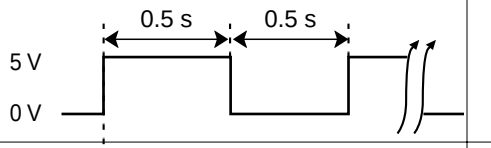
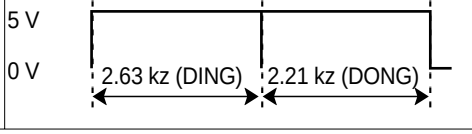
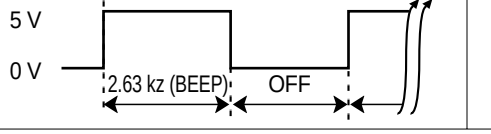


EXPLATION FOR MICOM CIRCUIT

CONDITIONS / MEASURING POINTS	Bell sounds when button on dosplay is pressed.	Beep sounds when warning door opening.	OFF
IC1 (No. 48 Pin)			5 V
IC1 (No. 51 Pin)			0 V

Measuring part / Door of Freezing/Cold Storage Room	**IC1 (MICOM) No. 47, 46 Pin**
Closing	5 V (Ⓐ - Ⓑ, Ⓒ - Ⓓ, Ⓔ - Ⓕ . S/W at both ends are at Off status)
Opening	5 V (Ⓐ - Ⓑ, Ⓒ - Ⓓ, Ⓔ - Ⓕ . S/W at both ends are at On status)

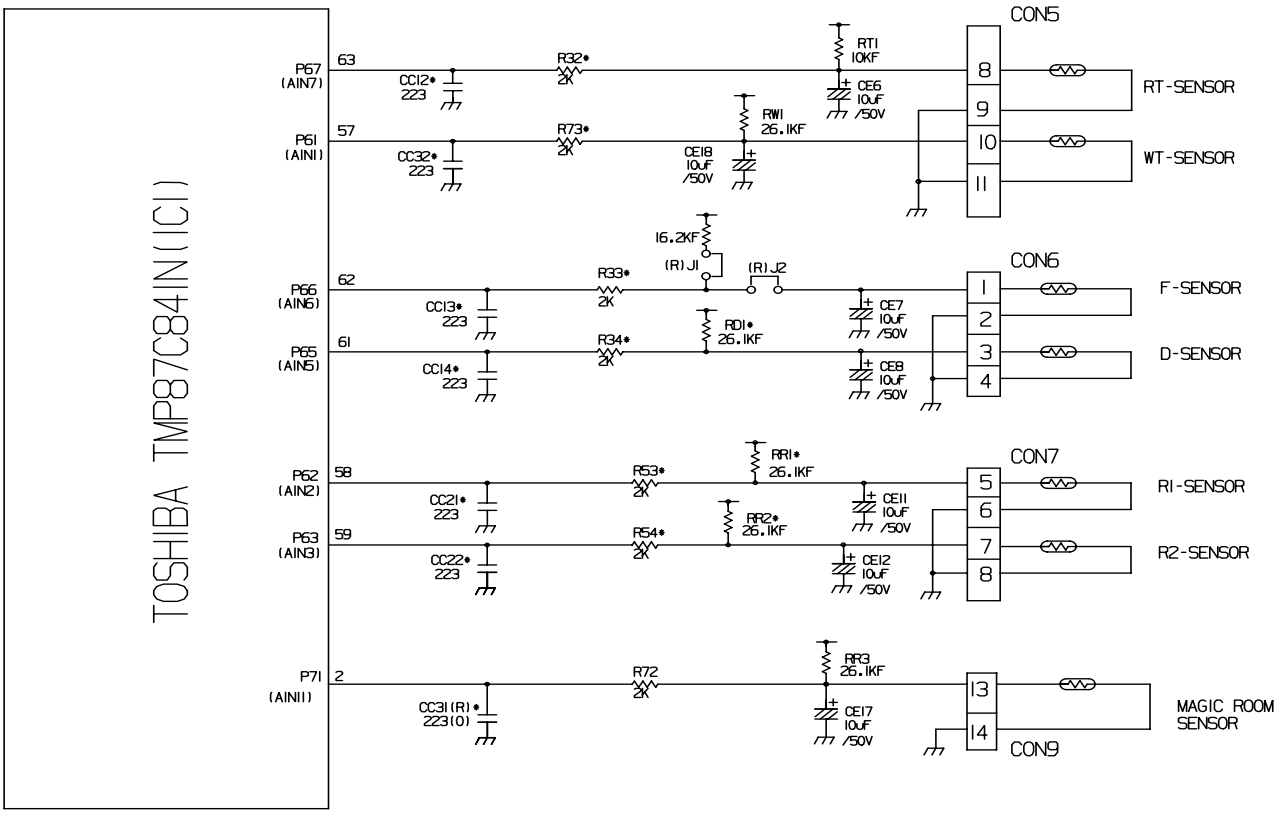
✻ Since door switch sensing switch (A), (B) are a separate switch even if the door switch of the freezing room normally operates, they may fail to sense door opening in the failure of switch at both ends of (A) and (B) or in failure of the L/wire.

✻ Lamp does at the cold storage room not turn on if the door switch of the cold storage room fails to sense the door open switch (c), (d) or the home bar switch.

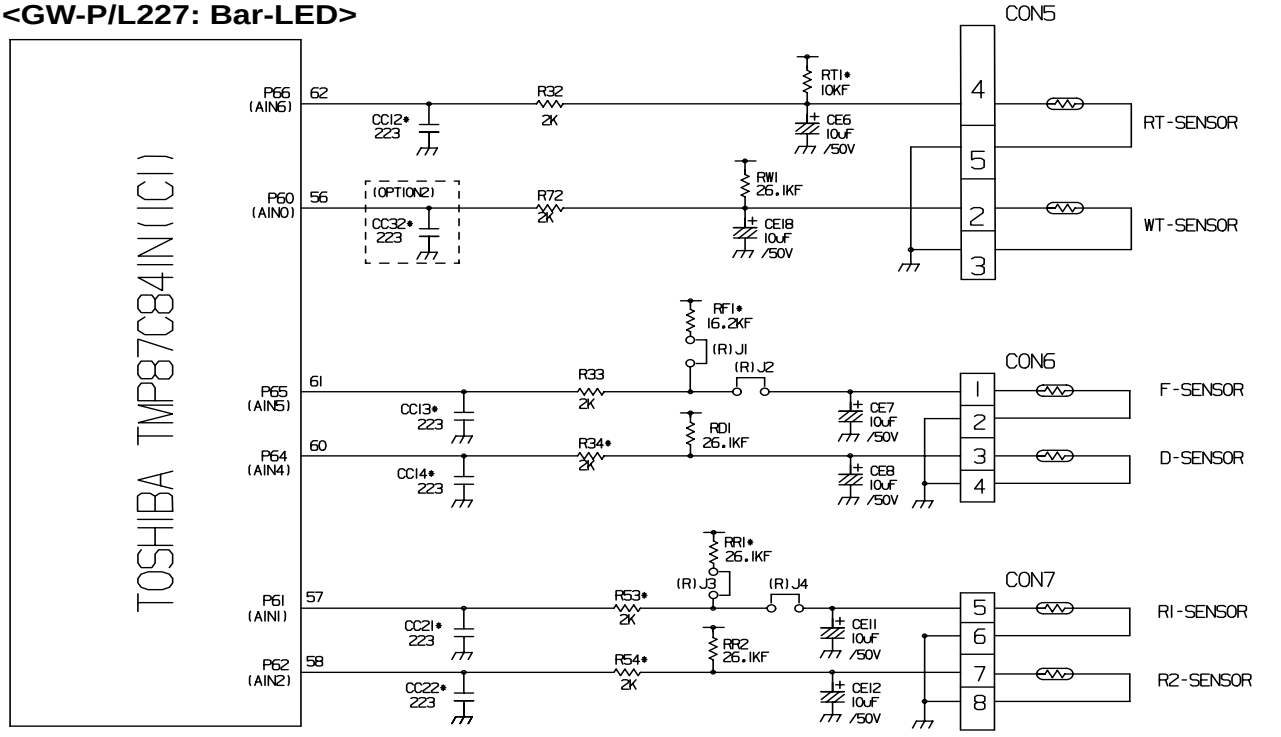
EXPLATION FOR MICOM CIRCUIT

1-5. Temperature sensing circuit

<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



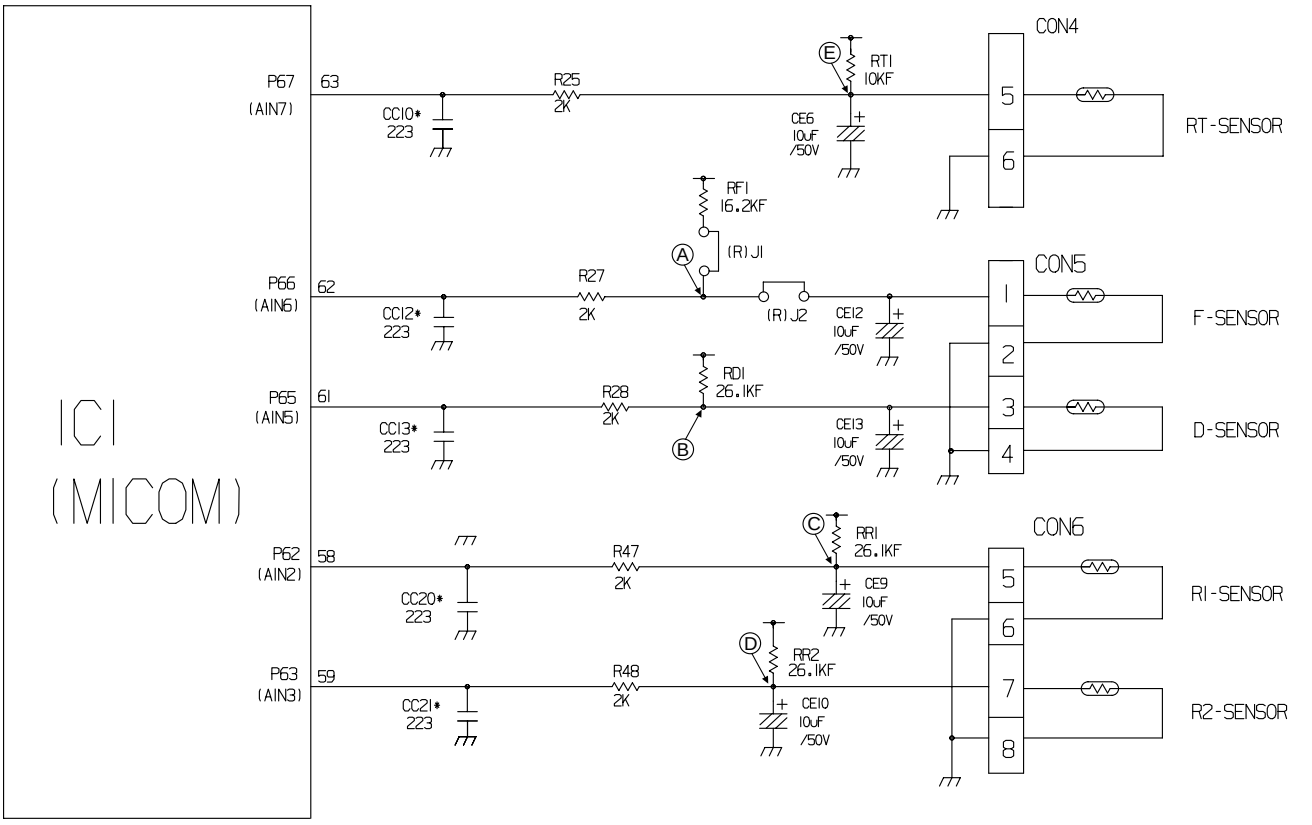
EXPLATION FOR MICOM CIRCUIT

The above circuits are circuits attached to freezing room sensor or cold storage room sensor for adjusting setting temperature at the freezing room and cold storage room, ice-making sensor for sensing water temperature in ice-making, or an evaporator for sensing temperature of a frost removal sensor necessary for frost removal. Short or open status of every temperature sensor is as follows:

SENSOR	CHECK POINT	NORMAL(-30 ℃ ~ 50 ℃)	IN SHORT	IN OPEN
Freezing sensor	POINT Ⓐ Voltage	0.5 V~4.5 V	0 V	5 V
Frost removal sensor	POINT Ⓑ Voltage			
Cold storage sensor 1	POINT Ⓒ Voltage			
Cold storage sensor 2	POINT Ⓓ Voltage			
Ice making sensor	POINT Ⓔ Voltage			
Room temperature sensor	POINT Ⓕ Voltage			

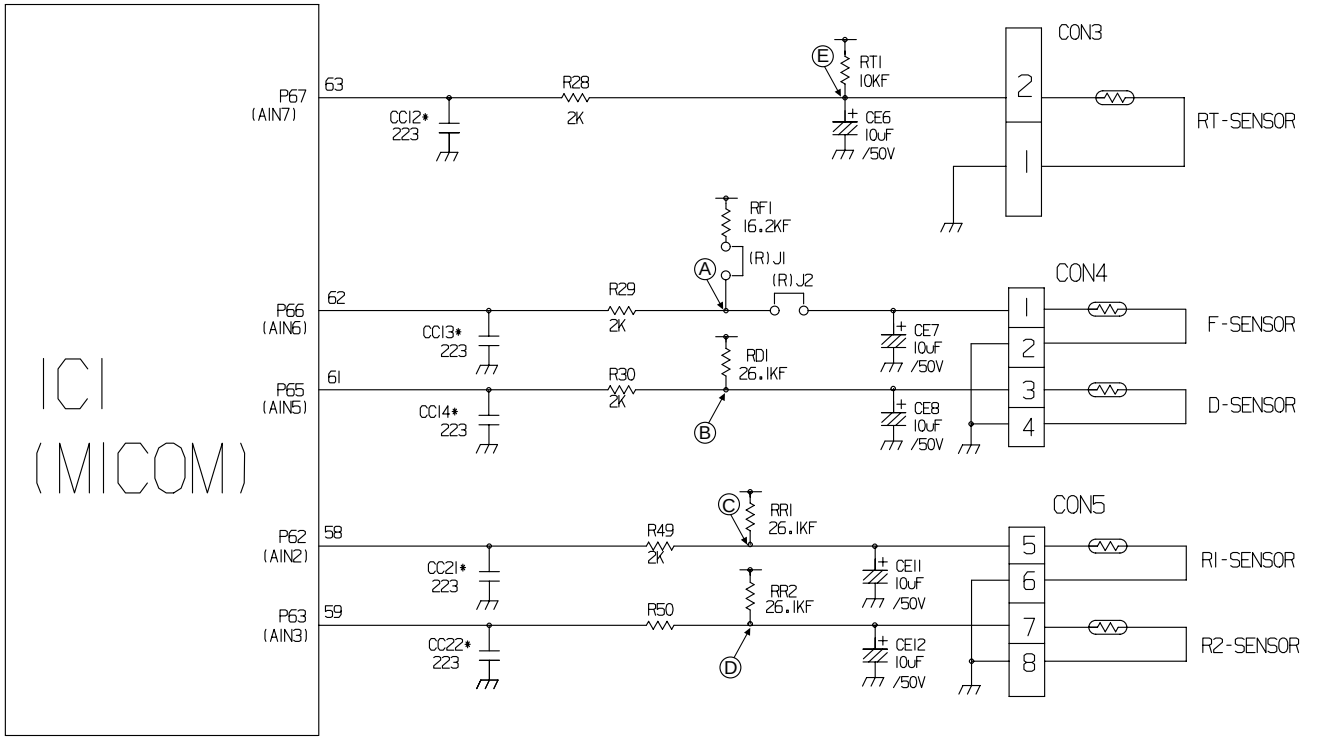
EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: Bar-LED>



The above circuits are circuits attached to freezing room sensor or cold storage room sensor for adjusting setting temperature at the freezing room and cold storage room, ice-making sensor for sensing water temperature in ice-making, or an evaporator for sensing temperature of a frost removal sensor necessary for frost removal. Short or open status of every temperature sensor is as follows:

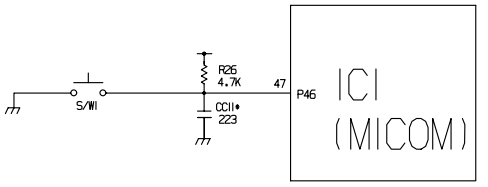
SENSOR	CHECK POINT	NORMAL(-30 ℃ ~ 50 ℃)	IN SHORT	IN OPEN
Freezing sensor	POINT Ⓐ Voltage	0.5 V~4.5 V	0 V	5 V
Frost removal sensor	POINT Ⓑ Voltage			
Cold storage sensor 1	POINT Ⓒ Voltage			
Cold storage sensor 2	POINT Ⓓ Voltage			
Room temperature sensor	POINT Ⓔ Voltage			

EXPLATION FOR MICOM CIRCUIT

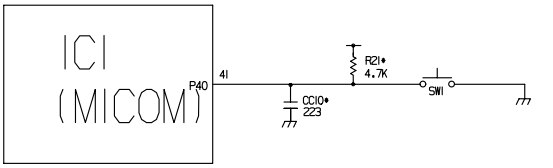
1-6. Switch entry circuit

The following circuits are entry circuits for sensing signal form test S/W, electronic single motor damper reed S/W for examining refrigerator.

<GW-B/C227: 88-LED>



<GW-B/C227: Bar-LED>



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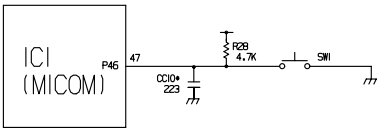
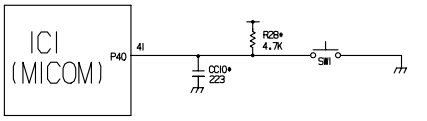
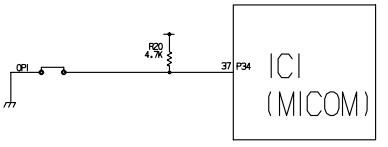


<GW-P/L227: Bar-LED>

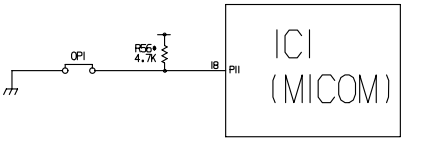


1-7. Option designation circuit (model separation function)

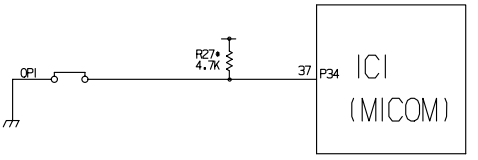
<GW-B/C227: 88-LED>



<GW-B/C227: Bar-LED>



<GW-P/L227: 88-LED>



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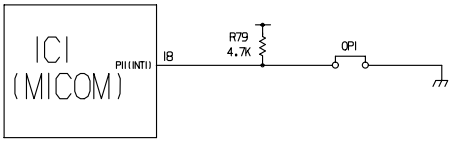


The above circuits are used for designating separation by model as option and notifying it to MICOM. Designation of option by model and the application standards are as follows:

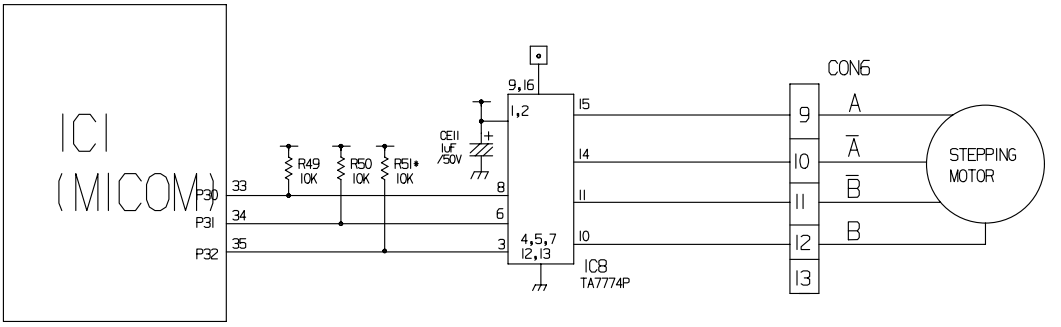
▶ These circuits are accurately pre-adjusted in shipment from factory and so you must not additionally add or remove option.

Separation	Connection Status	Application Standard
OP1	Connection	Export model
	OUT	Domestic model

EXPLATION FOR MICOM CIRCUIT

1-8. Stepping motor operation circuit

<GW-B/C227: 88-LED>



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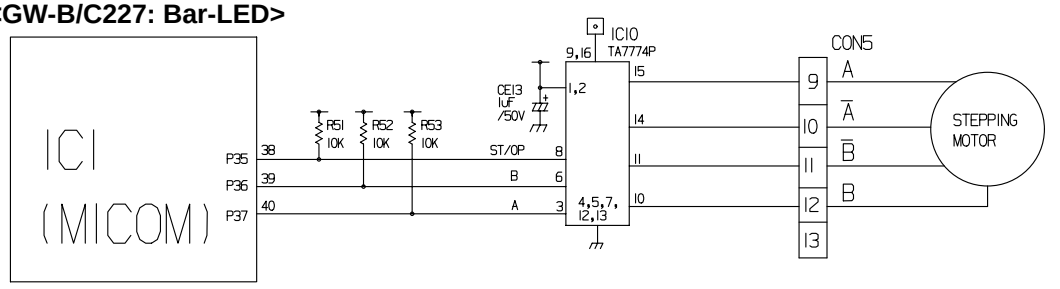

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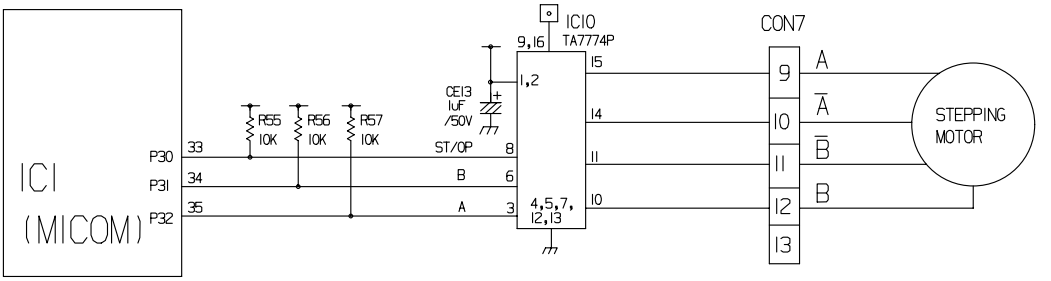
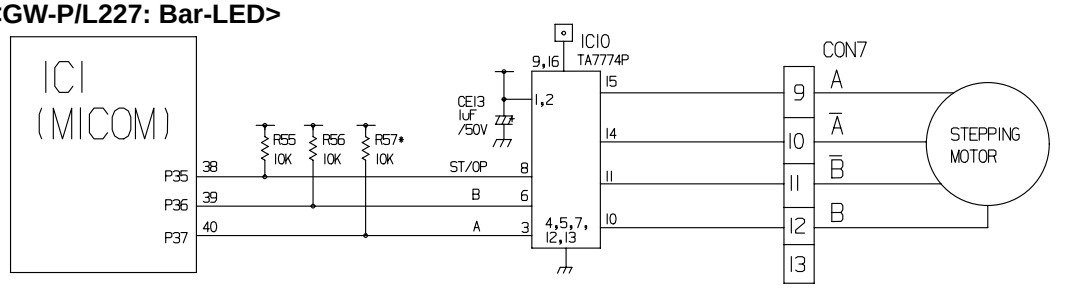


<GW-P/L227: Bar-LED>

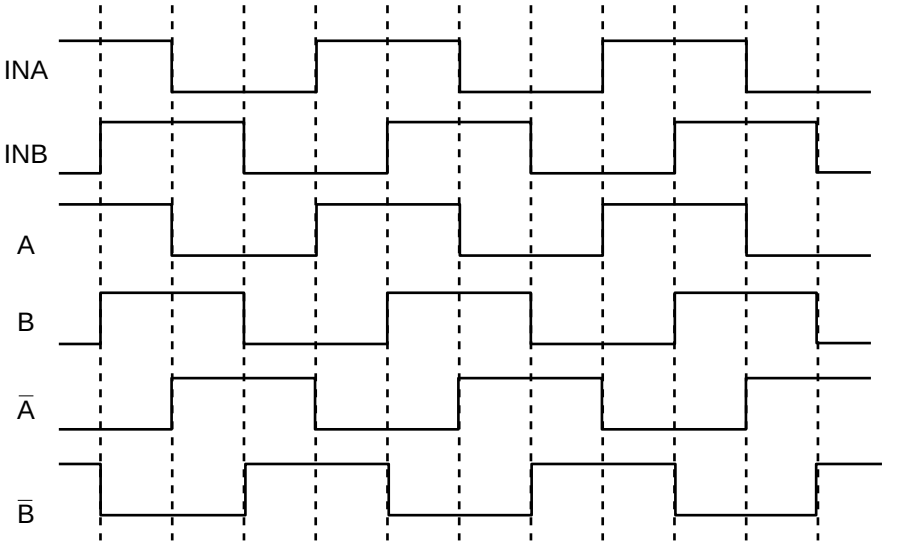


EXPLATION FOR MICOM CIRCUIT

For motor driving method, rotation magnetism is formed at coils wound on each phase of motor and stator and so motor becomes to rotate if applying “High” signal to the IC8 (TA777AF) at the MICOM PIN 33 and outputting “High”, “Low” signal by step numbers fixed through MICOM PIN 34 and 35,.

Explanation) For driving method of the stepping motor, send signals in the cycle of 3.33 mSEC using terminal of MICOM PIN 33, 34 and 35 as shown in wave form of the following part.
These signals are output to the output terminal (No.10, 11, 14, 15) via the input terminal (No. 3, 6, 8) of the IC10 (TA7774F) as IC for motor driving. Output signals allow motor coils wound on each phase of stator to form rotation magnetic field and the motor to rotate. Inputting as below figure to the input terminal (INA, INB) as IC (TA7774AF) for motor driving allows motor coils wound on each phase of stator to form rotation magnetic field and the stepping motor damper to rotate

CCW (Reverse rotation) ◀——— ——— ▶ (Positive rotation) CW



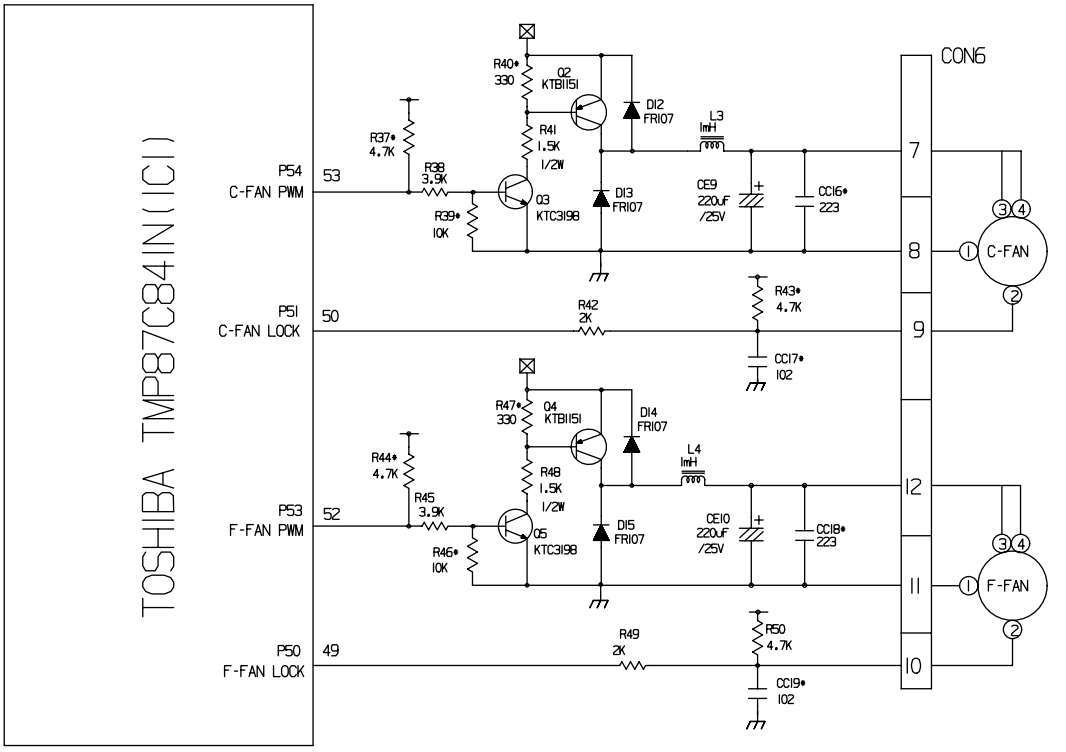
EXPLATION FOR MICOM CIRCUIT

1-9. Fan motor driving circuit (freezing room, M/C room)

1. This circuit performs function to make standby power ‘0’ by cutting off power supplied to ICs inside of the fan motor in the fan motor OFF.
2. This is a circuit to perform a temporary change of speed for the fan motor and applies DC voltage up to 7.5V ~ 16V to motor.
3. This circuit performs function not to drive the fan motor further by cutting off power applied to the fan motor in the lock of fan motor by sensing the operation RPM of the fan motor.

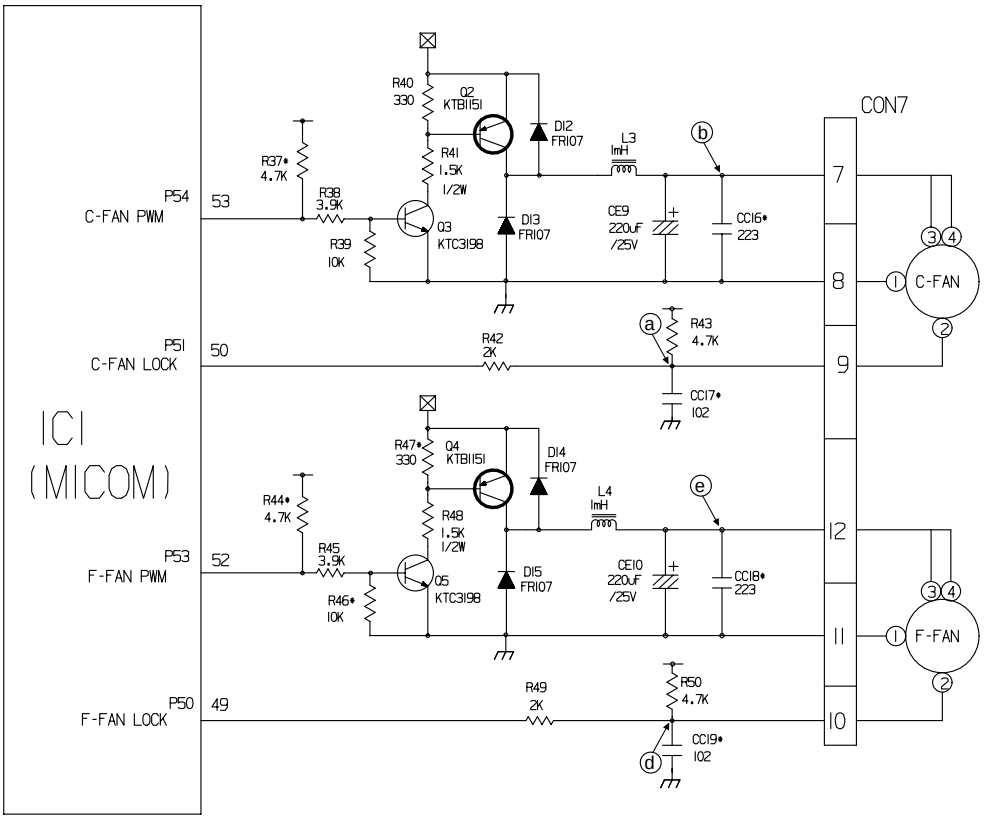
	ⓐ, ⓓ part	ⓑ part	ⓔ part
Motor OFF	5V	2V or less	2V or less
Motor ON	2 ~ 3V	12 ~ 14V	8 ~ 16V

<GW-P/L227: 88-LED>



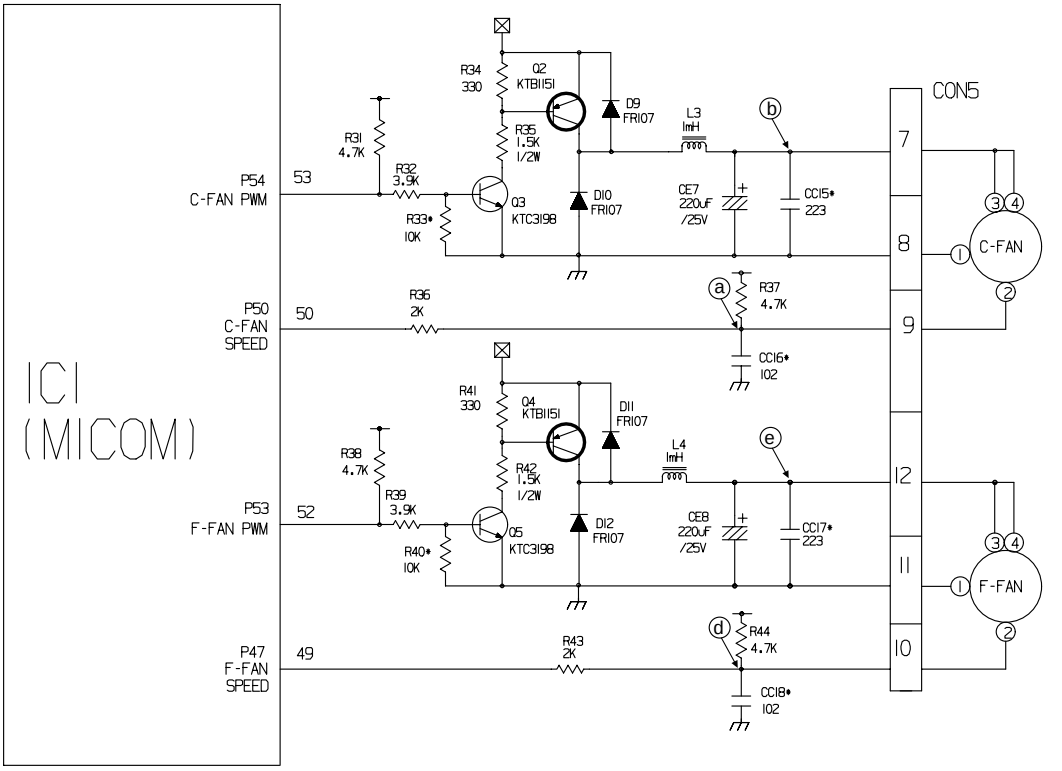
EXPLATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>



EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



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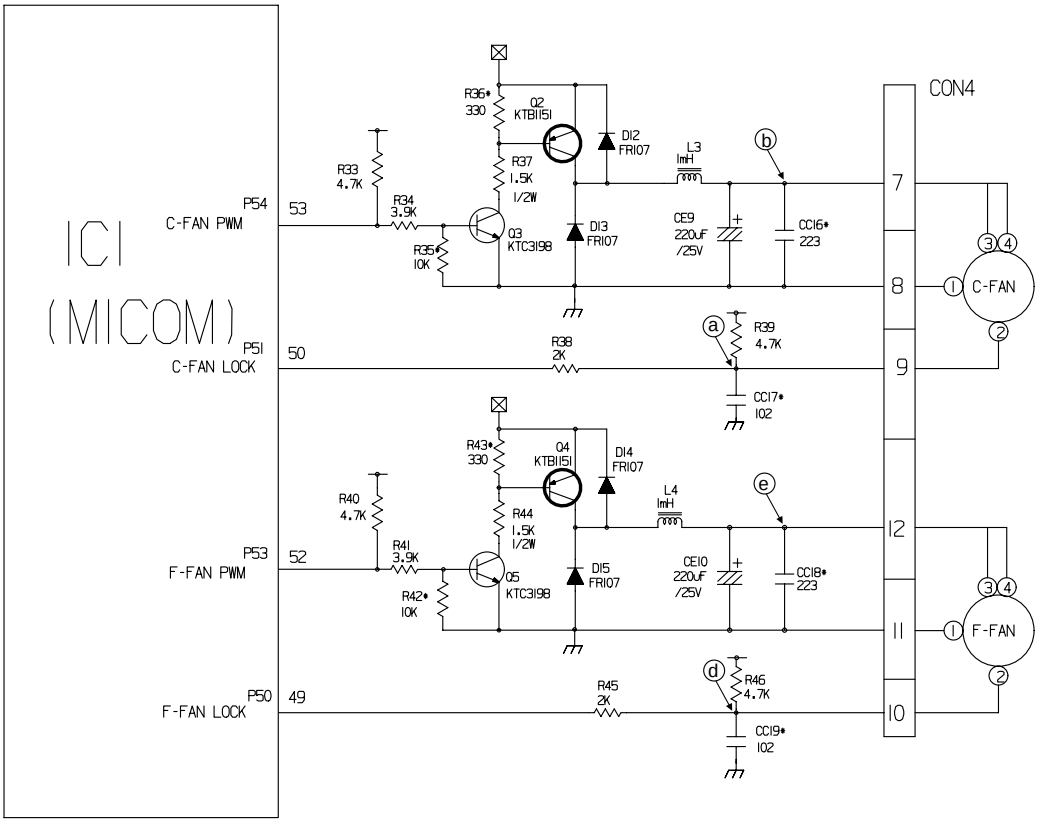
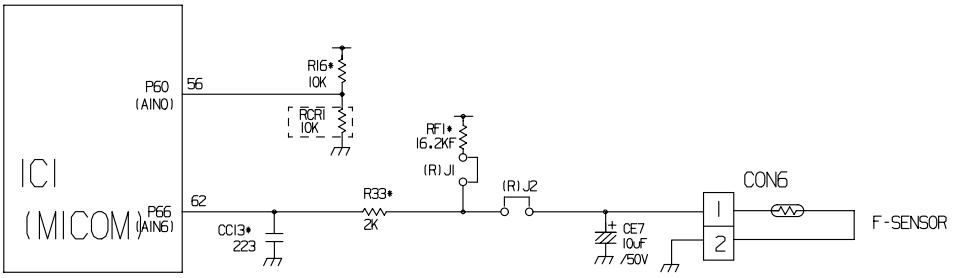


EXPLATION FOR MICOM CIRCUIT

1-10. Temperature compensation and over-cool/weak-cool compensation circuit

1. Temperature compensation at freezing room, cold storage room

<GW-P/L227: 88-LED>



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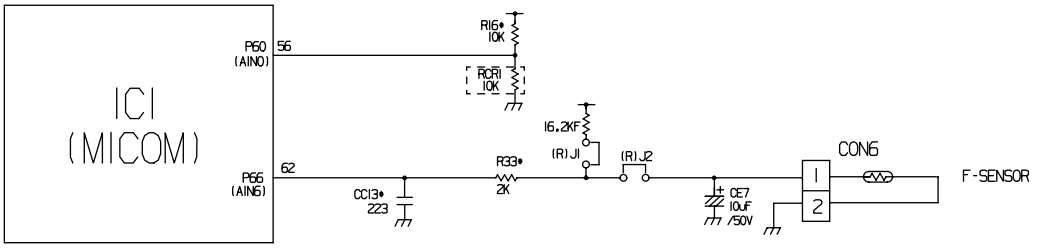

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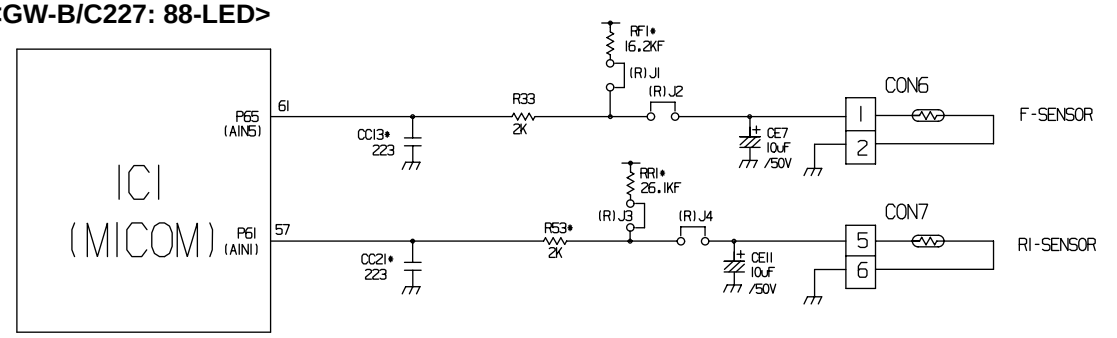

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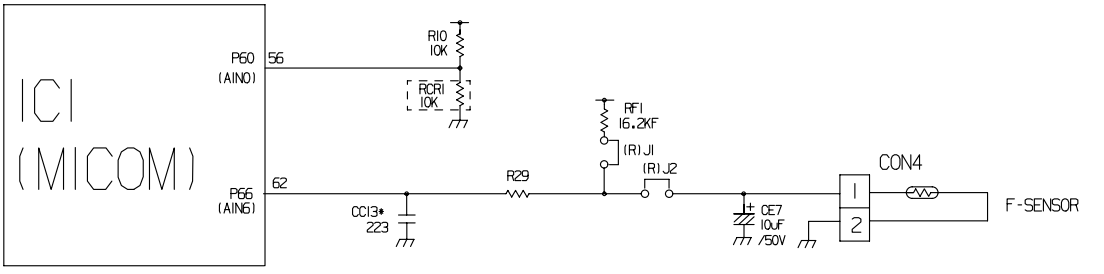


EXPLATION FOR MICOM CIRCUIT

: JUMP WIRE

Freezing room			Cold storage room		Remarks
Resistance value (R)J1	Resistance value (R)J2	Temperature compensation	Resistance value (RCR1)	Temperature compensation	
	6.2 kΩ	+5 °C	180 kΩ	+2.5 °C	Warmly compensate
	5.1 kΩ	+4 °C	56 kΩ	+2.0 °C	
	3 kΩ	+3 °C	33 kΩ	+1.5 °C	
	2.4 kΩ	+2 °C	18 kΩ	+1.0 °C	
	1.2 kΩ	+1 °C	12 kΩ	+0.5 °C	
		0 °C	10 kΩ	0 °C	Reference temperature
1 kΩ		-1 °C	8.2 kΩ	-0.5 °C	Coolly compensate
1.8 kΩ		-2 °C	5.6 kΩ	-1.0 °C	
2.7 kΩ		-3 °C	3.3 kΩ	-1.5 °C	
3.9 kΩ		-4 °C	2 kΩ	-2.0 °C	
5.1 kΩ		-5 °C	470 Ω	-2.5 °C	

▶ Temperature compensation table by adjustment value (difference value against current temperature)

Ex) If changing compensation resistance at a cold storage room (RCR1) from 10 kΩ (current resistance) to 18 kΩ (modified resistance), temperature at the cold storage will increase by +1°C.

Ex) Now (R)J1= , (R)J2=1.2kΩ, RCRI=5.6kΩ ⟶ want to compensate -2°C for Freezing room temperature and +2°C for Cold storage room temperature

(R)J1 = 12kΩ ⟶ 1kΩ
(R)J2 = 12kΩ ⟶
RCRI = 5.6kΩ ⟶ 18kΩ

EXPLATION FOR MICOM CIRCUIT

▶ Temperature compensation table at the cold storage room is as follows:

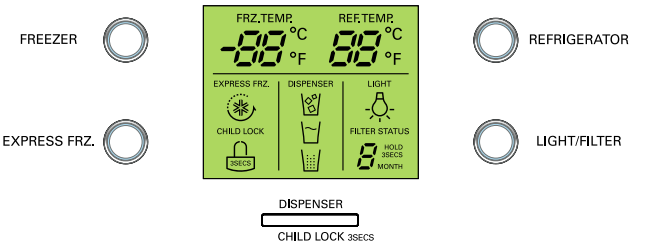
	Modification resistance / Current resistance	470 Ω	2 kΩ	3.3 kΩ	5.6 kΩ	8.2 kΩ	10 kΩ	12 kΩ	18 kΩ	33 kΩ	56 kΩ	180 kΩ
Cold storage room (RCR1)	470Ω	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up	3.5 °C Up	4 °C Up	4.5 °C Up	5 °C Up
	2 kΩ	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up	3.5 °C Up	4 °C Up	4.5 °C Up
	3.3 kΩ	1 °C Down	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up	3.5 °C Up	4 °C Up
	5.6 kΩ	1.5 °C Down	1 °C Down	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up	3.5 °C Up
	8.2 kΩ	2 °C Down	1.5 °C Down	1 °C Down	0.5 ° Drop	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up
	10 kΩ	2.5 °C Down	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up
	12 kΩ	3 °C Down	2.5 °C Down	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up
	18 kΩ	3.5 °C Down	3 °C Down	2.5 °C Down	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up
	33 kΩ	4 °C Down	3.5 °C Down	3 °C Down	2.5 °C Down	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Down	No change	0.5 °C Up	1 °C Up
	56 kΩ	4.5 °C Down	4 °C Down	3.5 °C Down	3 °C Down	2.5 °C Down	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Down	No change	0.5 °C Up
	180 kΩ	5 °C Down	4.5 °C Down	4 °C Down	3.5 °C Down	3 °C Down	2.5 °C Down	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Down	No change

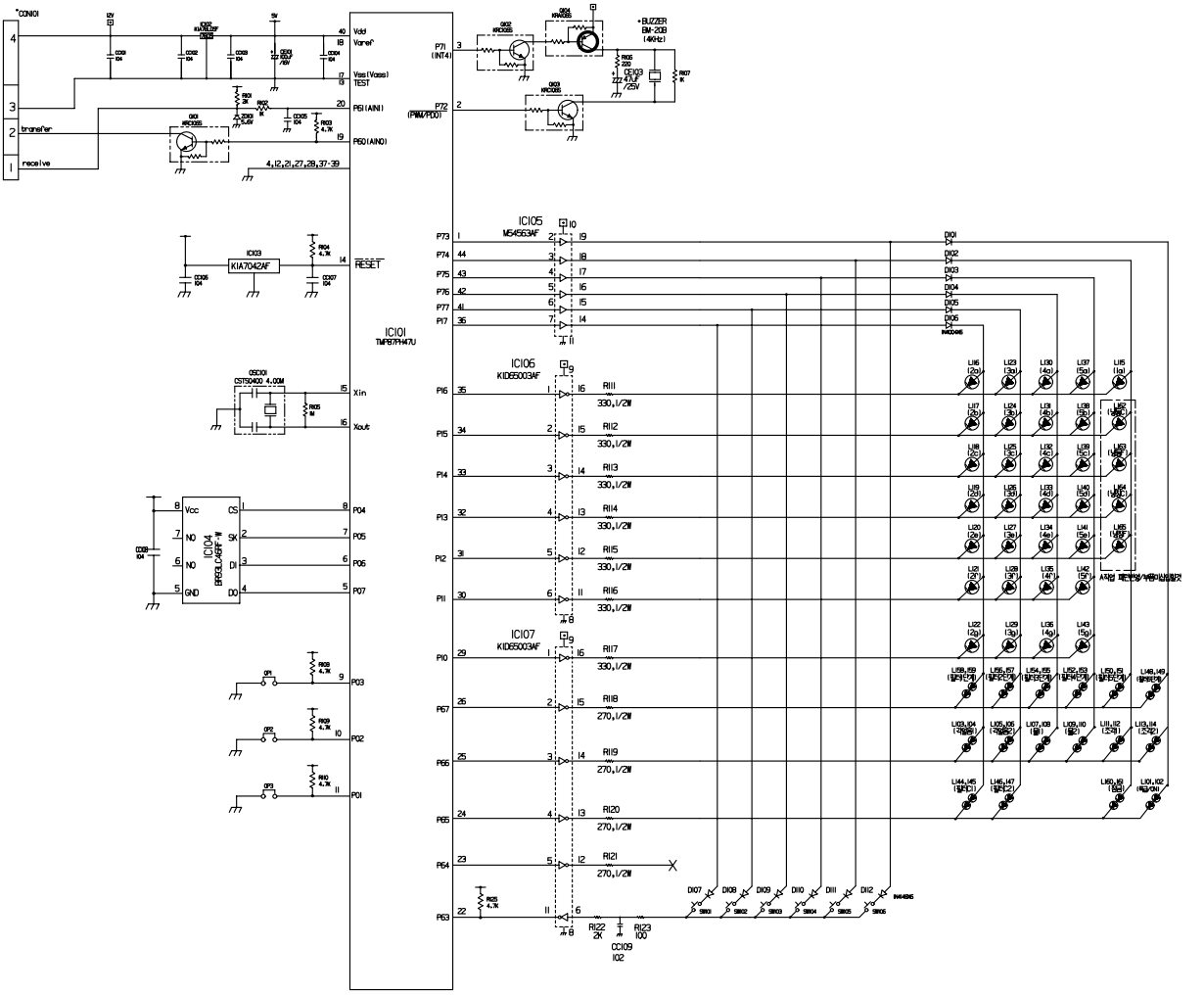
▶ This circuit is a circuit to enter the necessary level of temperature compensation for adjusting different temperature every model at the cold storage room into MICOM.

EXPLATION FOR MICOM CIRCUIT

1-11. Display Circuit

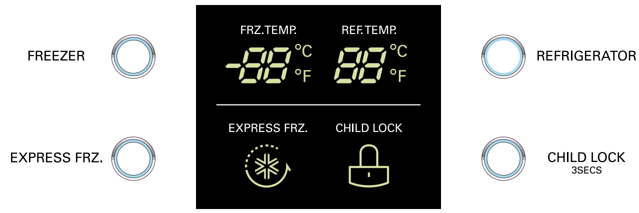
<GW-P/L227>

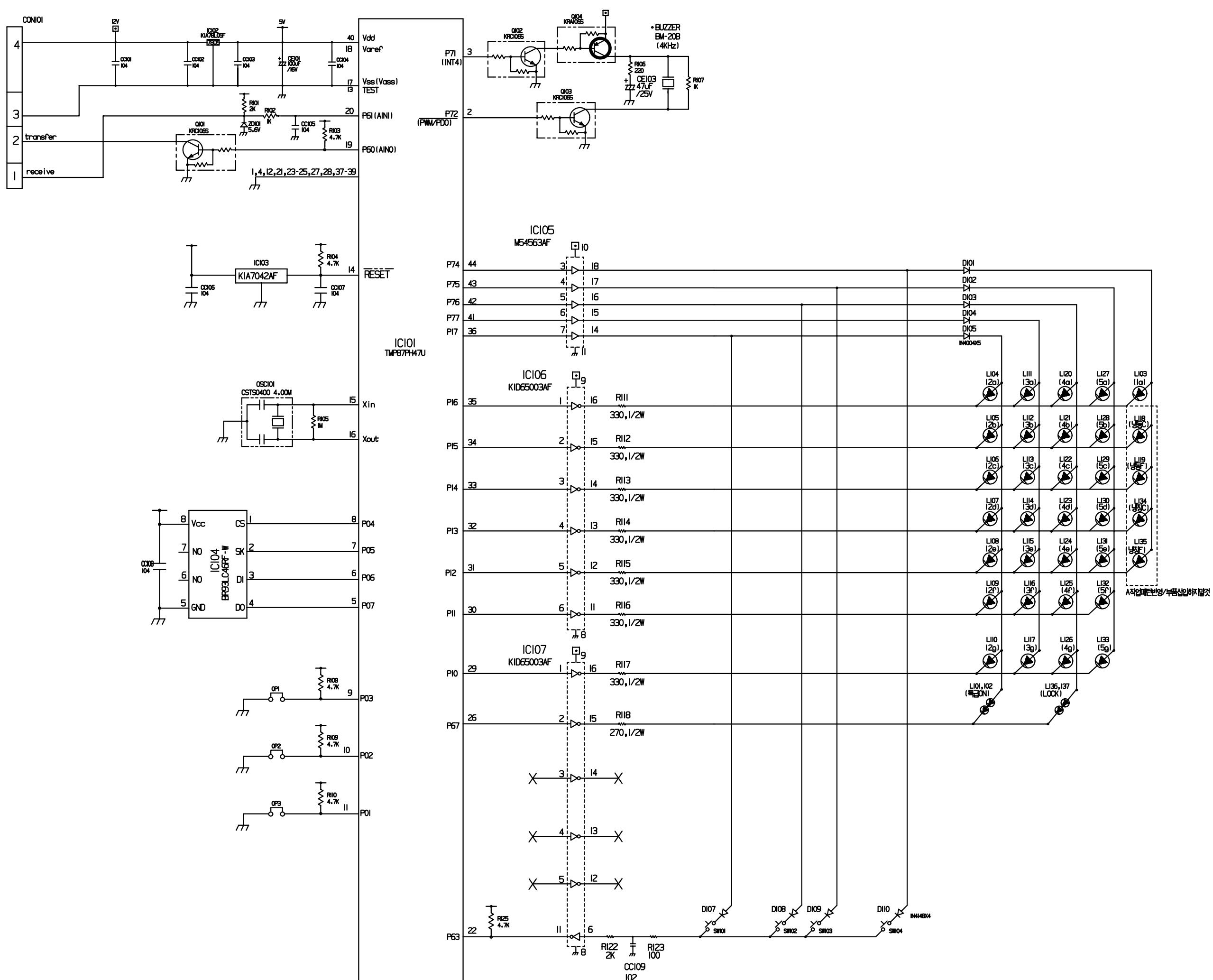




EXPLATION FOR MICOM CIRCUIT

<GW-B/C227>



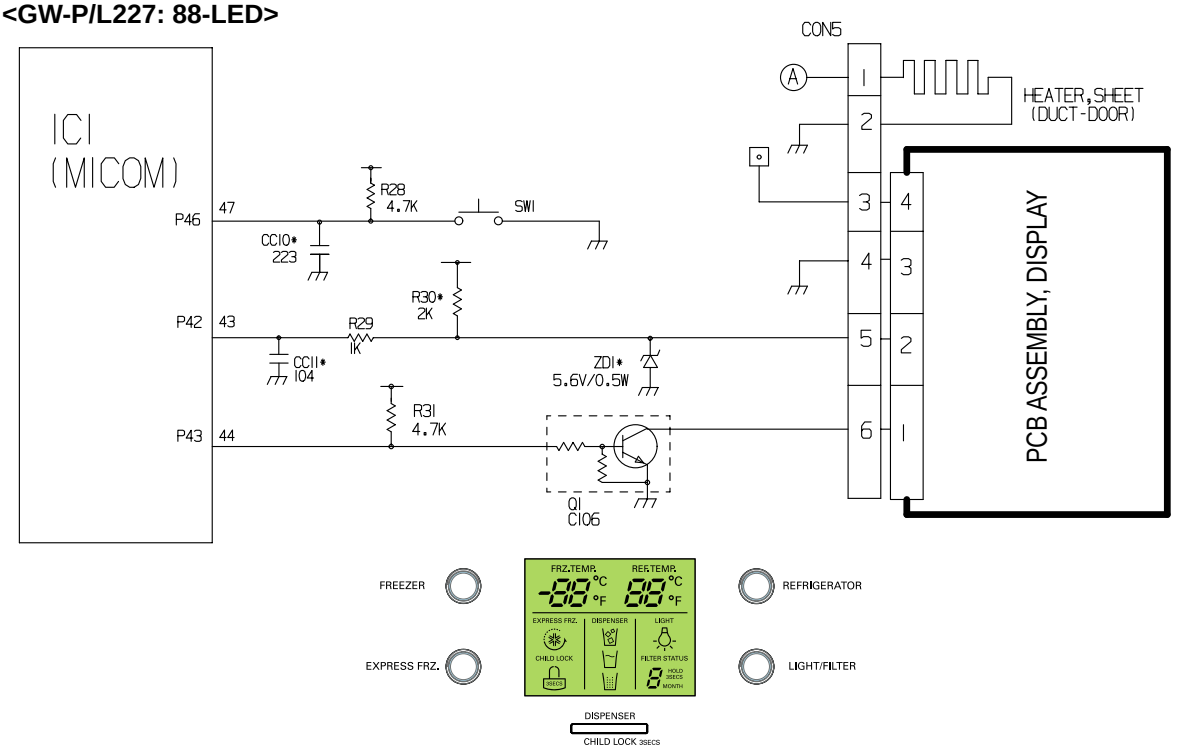

CON101
transfer
receive
12V
5V
IC102 KIA78L05F
CC101 104
CC102 104
CC103 104
CE101 100uF /16V
CC104 104
Vdd
Varef
Vss(Vass)
TEST
P61(AIN1)
P60(AIN0)
R101 2K
R102 1K
ZD101 5.6V
CC105 104
R103 4.7K
Q101 KRC106S
1,4,12,21,23-25,27,28,37-39
IC103 KIA7042AF
R104 4.7K
CC106 104
CC107 104
RESET
IC101 TMP87PH47U
OSC101 CSTS0400 4.00M
R105 1M
Xin
Xout
IC104 BR93LC46RF-W
Vcc
NO
NO
GND
CS
SK
DI
DO
CC108 104
P04
P05
P06
P07
OP1
OP2
OP3
R108 4.7K
R109 4.7K
R110 4.7K
P03
P02
P01
P71 (INT4)
P72 (PWM/PD0)
Q102 KRC106S
Q103 KRC106S
Q104 KRA106S
BUZZER BM-20B (4KHz)
R106 220
CE103 47uF /25V
R107 1K
IC105 M54563AF
P74
P75
P76
P77
P17
D101
D102
D103
D104
D105
1N4004X5
IC106 KID65003AF
P16
P15
P14
P13
P12
P11
R111 330,1/2W
R112 330,1/2W
R113 330,1/2W
R114 330,1/2W
R115 330,1/2W
R116 330,1/2W
IC107 KID65003AF
P10
P67
R117 330,1/2W
R118 270,1/2W
L104 (2a)
L111 (3a)
L120 (4a)
L127 (5a)
L103 (1a)
L105 (2b)
L112 (3b)
L121 (4b)
L128 (5b)
L118
L106 (2c)
L113 (3c)
L122 (4c)
L129 (5c)
L119
L107 (2d)
L114 (3d)
L123 (4d)
L130 (5d)
L134
L108 (2e)
L115 (3e)
L124 (4e)
L131 (5e)
L135
L109 (2f)
L116 (3f)
L125 (4f)
L132 (5f)
L110 (2g)
L117 (3g)
L126 (4g)
L133 (5g)
L101,102
L136,137 (LOCK)
P63
R125 4.7K
R122 2K
R123 100
CC109 102
D107
D108
D109
D110
1N4148X4
SW101
SW102
SW103
SW104

EXPLATION FOR MICOM CIRCUIT

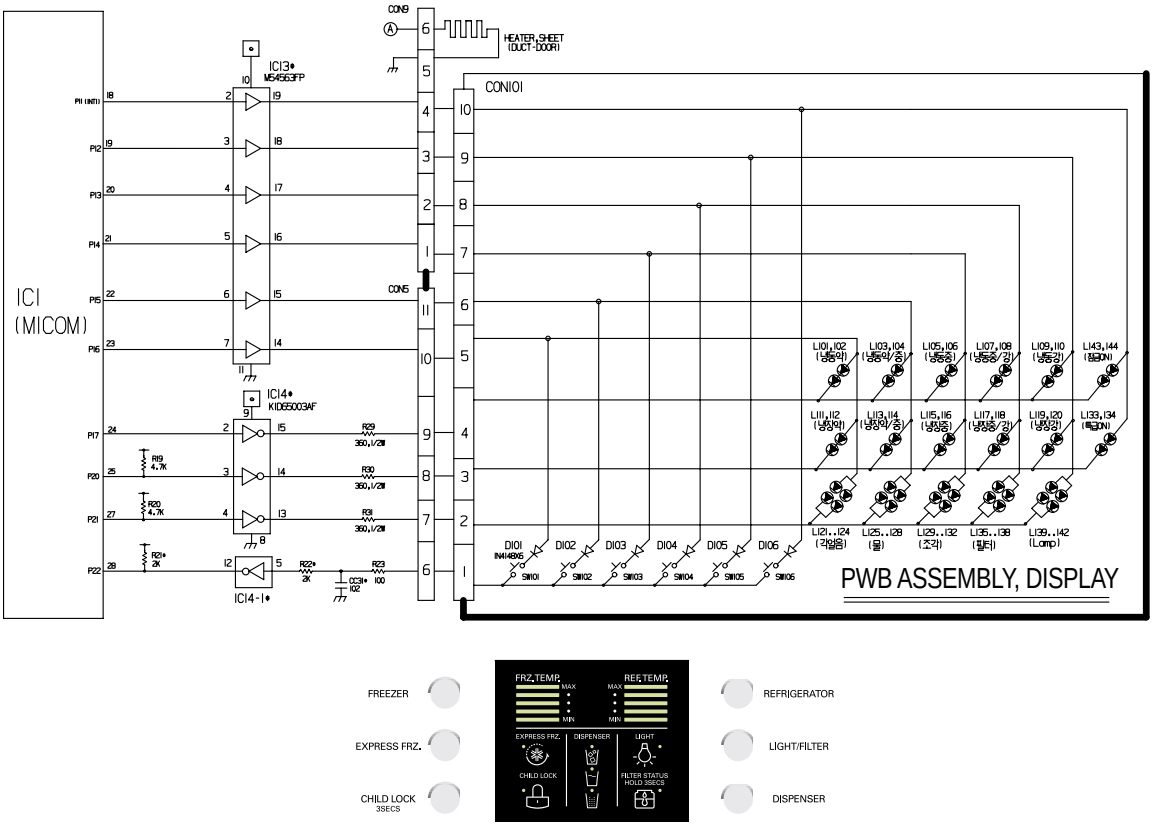
1-12. Key Button Input and Display Lighting Circuit

This circuit is to judge the work of function control button on the operation panel and to light each function indication led (LED module). It is driven by SCAN method.

<GW-P/L227: 88-LED>

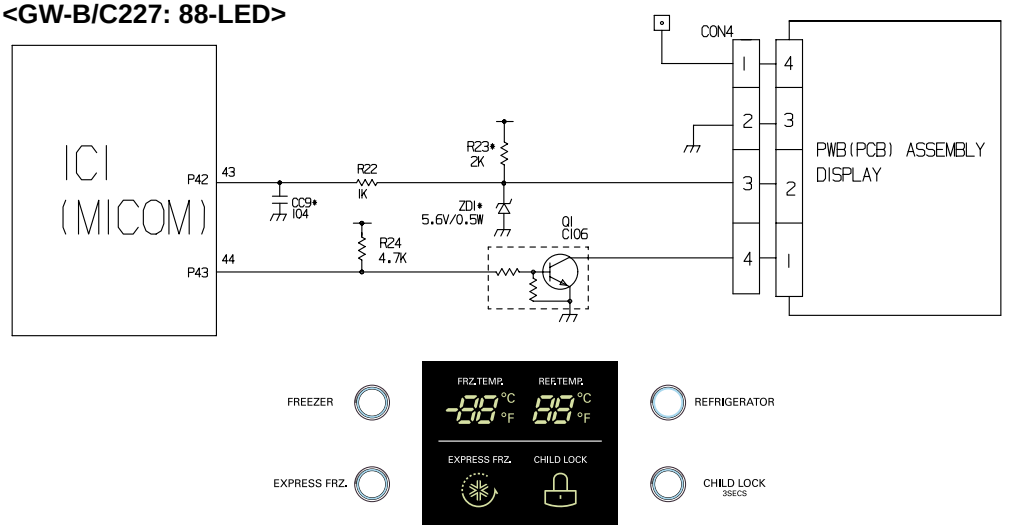


<GW-P/L227: Bar-LED>



EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



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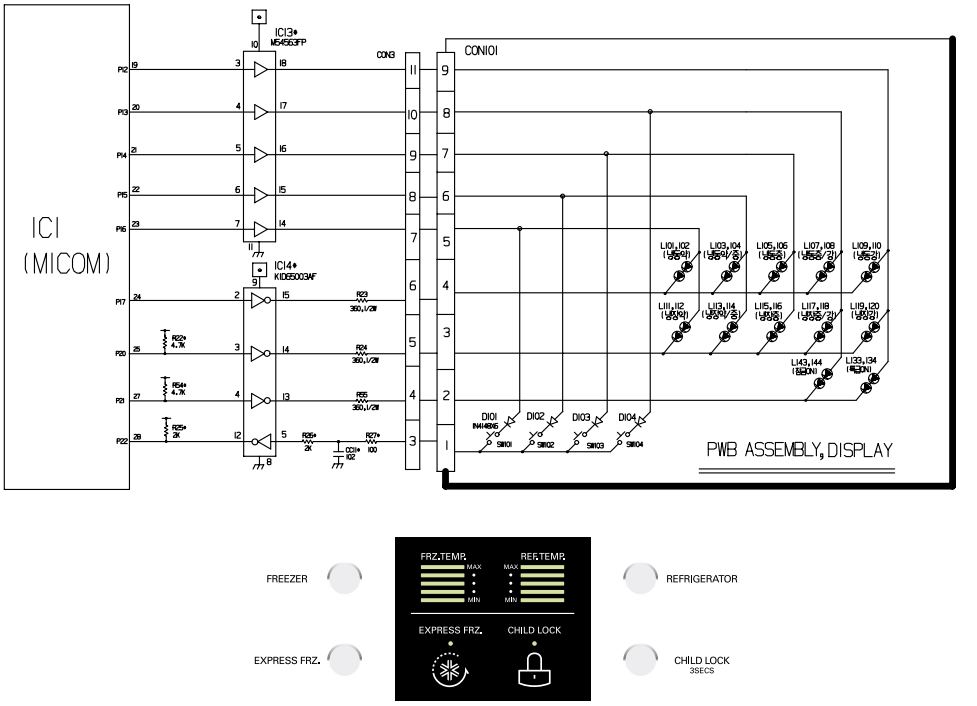
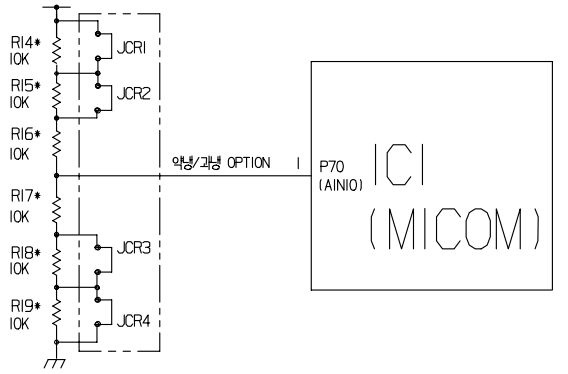


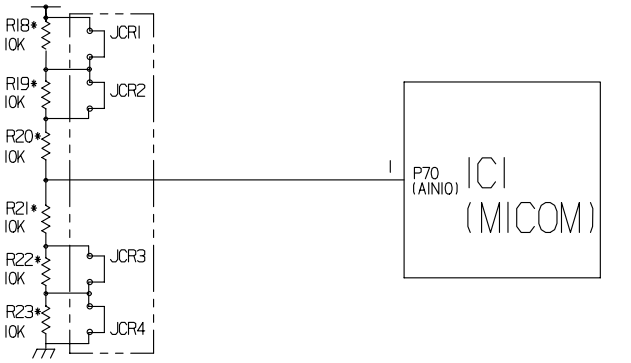
EXPLATION FOR MICOM CIRCUIT

2. Compensation circuit for weak-cold, over-cold at freezing room

<GW-P/L/B/C227: 88-LED>



<GW-P/L/B/C227: Bar-LED>



	Temperature compensation in CUT	
JCR1	+1 °C	+2 °C
JCR2	+1 °C	
JCR3	-1 °C	-2 °C
JCR4	-1 °C	

Compensation for weak-cold		Compensation for over-cold		Temperature compensation value at cold storage room	Remarks
JCR3	JCR4	JCR1	JCR2		
○ ○	○ ○	○ ○	○ ○	0 °C (In shipment from factory)	
CUT	○ ○	○ ○	○ ○	-1 °C	
○ ○	CUT	○ ○	○ ○	-1 °C	
○ ○	○ ○	CUT	○ ○	+1 °C	
○ ○	○ ○	○ ○	CUT	+1 °C	
CUT	CUT	○ ○	○ ○	-2 °C	
○ ○	○ ○	CUT	CUT	+2 °C	
CUT	○ ○	CUT	○ ○	0 °C	
CUT	○ ○	○ ○	CUT	0 °C	
○ ○	CUT	CUT	○ ○	0 °C	
○ ○	CUT	○ ○	CUT	0 °C	
CUT	CUT	CUT	○ ○	-1 °C	
○ ○	CUT	CUT	CUT	+1 °C	
CUT	CUT	CUT	CUT	0 °C	

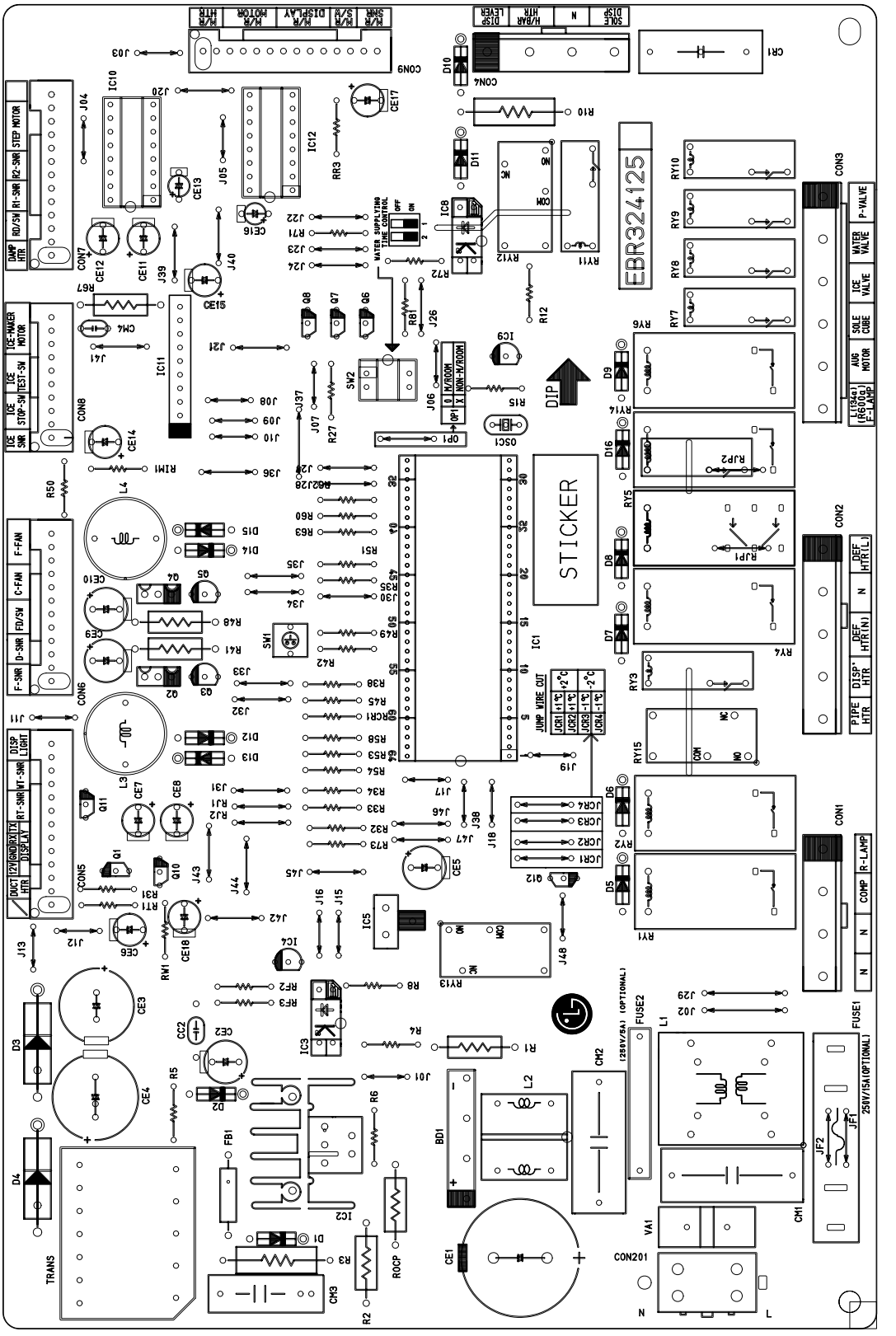
▶ The above option circuit is a circuit to compensate for temperature at the cold storage room by simply cutting in service.

EXPLATION FOR MICOM CIRCUIT

3. PWB Parts Drawings and List

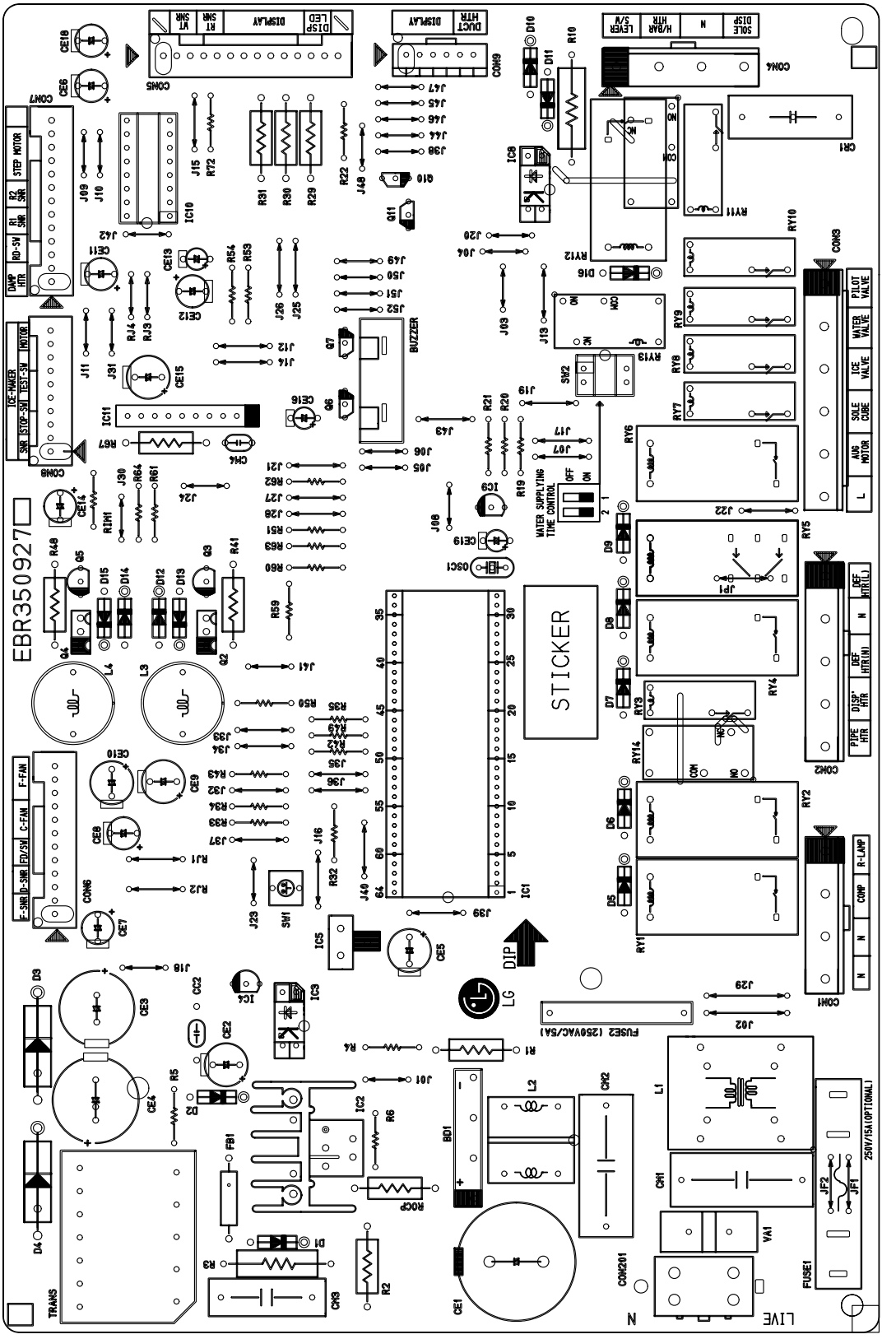
3-1. PWB Assembly Main Parts Drawings

<GW-P/L227: 88-LED>



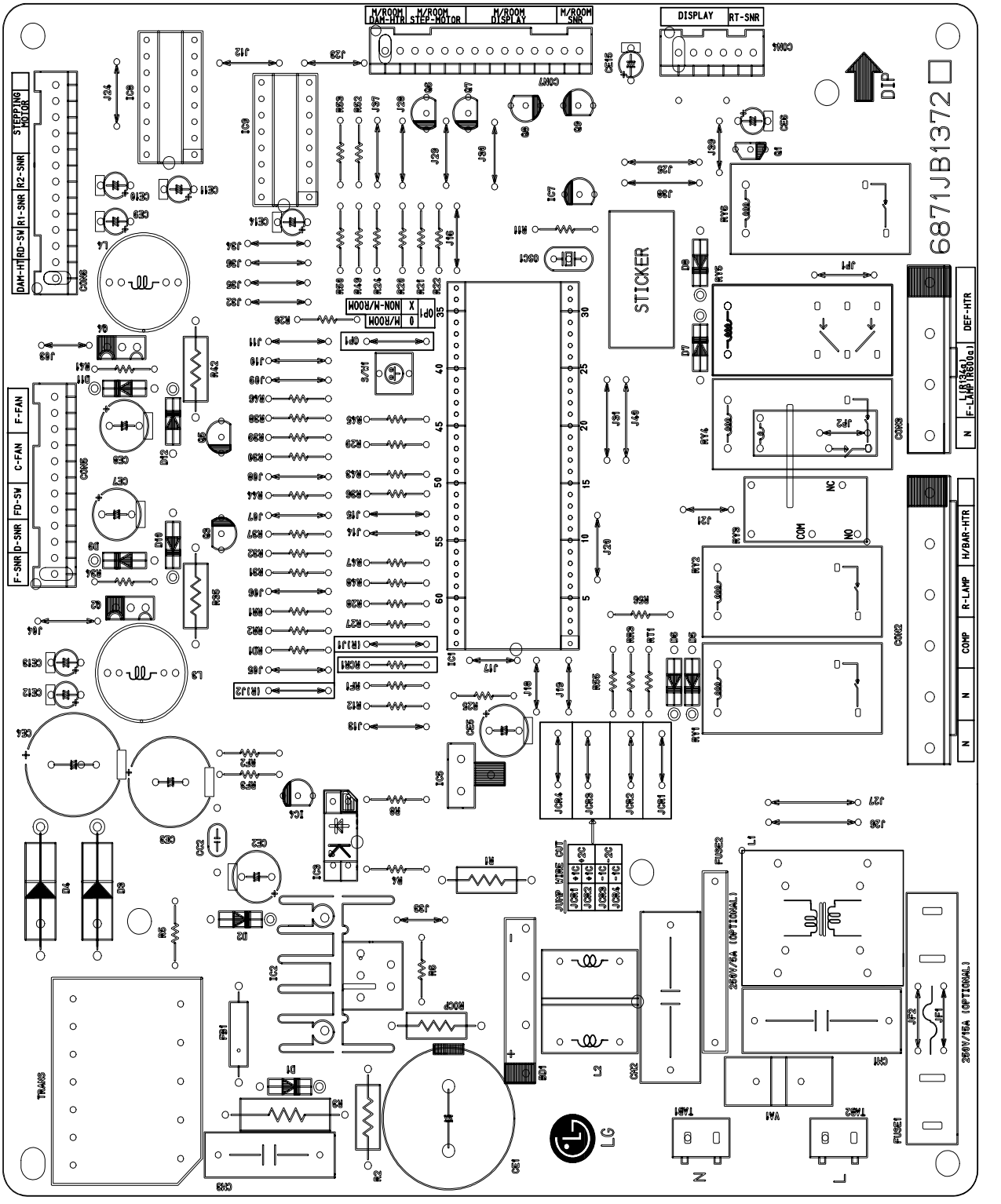
EXPLATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>



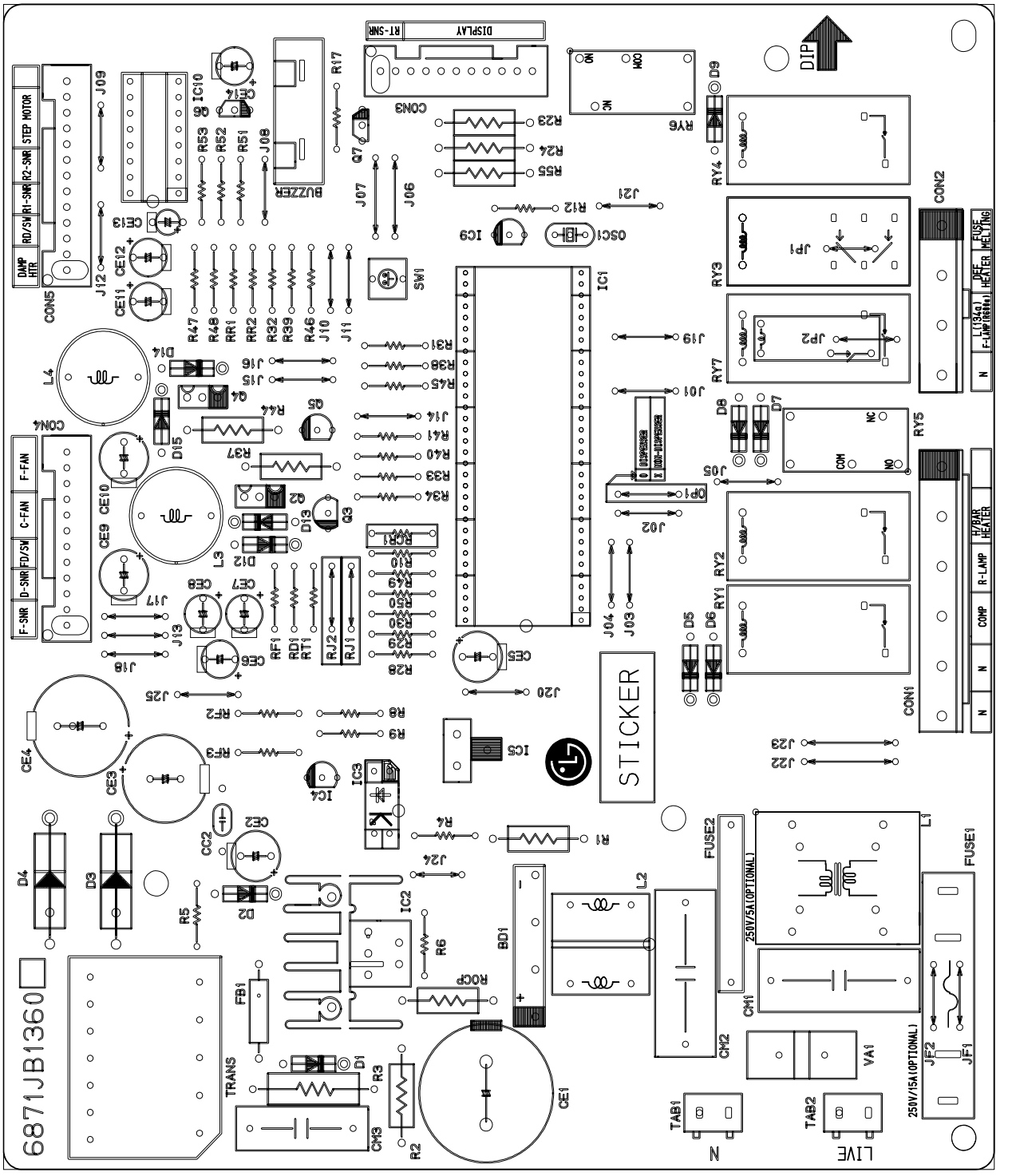
EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: Bar-LED>



EXPLATION FOR MICOM CIRCUIT

3-2. Parts List
<GW-P/L227: 88-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	EAX32478001	PWB(PCB)	BUCKINGHAM-PJT BEST DLX 88 VER-1	DOO SAN(SHIN HYUP)	T=1.6(DLX 88)
1	EAX32478002	PWB(PCB)	BUCKINGHAM-PJT BEST DLX VER-1	DOO SAN(SHIN HYUP)	T=1.6(DLX NONE M/ROOM)
2	6170.B20130	TRANSFORMER,SMPS(COIL)	032/CH-PJT DELUXE (NAES)	SAM IL, SMC	TRANS
2	6170.B20130	TRANSFORMER,SMPS(COIL)	032/CH-PJT DELUXE (00-07)V	SAM IL	TRANS
3	6630V90211A	CONNECTOR (CIRC),WAFER	1743390-1 250 2P HDR H5(11mm PITCH)	AMP	CON201
4	6630VM02609	CONNECTOR (CIRC),WAFER	YW396 9P 3.96MM (9P-2,4,6,8) YEONHO	YEON HO	CON2
5	6630VM04207	CONNECTOR (CIRC),WAFER	YW396-07AW(7P-2,4,6) RED	YEON HO	CON4(RED)
6	6630VM07107	CONNECTOR (CIRC),WAFER	YW396 YEONHO 7P 3.96MM (7P-2,4,6)	YEON HO	CON1
7	6630VM01111	CONNECTOR (CIRC),WAFER	YW396 YEONHO 11P 3.96MM YW396-11AV (11P-2,4,6,8,10)	YEON HO	CON3
8	6630.BB007L	CONNECTOR (CIRC),WAFER	917350-1 AMP 12P 2.54M STRAIGHT SN	AMP	CON5
9	6630.BB007J	CONNECTOR (CIRC),WAFER	917388-1 AMP 10P 2.54M STRAIGHT SN	AMP	CON9
10	6630.BB007M	CONNECTOR (CIRC),WAFER	917391-2 AMP 13P 2.54M STRAIGHT SN	AMP	CON5(RED)
11	6630.BB010A	CONNECTOR (CIRC),WAFER	917391-1 AMP 13P 2.54M STRAIGHT SN	AMP	CON7
12	EAN34017501	IC,DRAWING	TMP87PM49N 64P SDIP ST OTP BUCKINGHAM-PJT BEST 6P0R	TOSHIBA	IC1(=EAN34017602, MASK)
12	EAN34017503	IC,DRAWING	TMP87PM49N 64P SDIP ST OTP BUCKINGHAM-PJT BEST 8DMDEFN	TOSHIBA	IC1(=EAN34017604, MASK)
12	EAN34017507	IC,DRAWING	TMP87PM49N BIC328 TWIST ICEMAKER-PJT OTP SDIP ST 64P 6P0R	TOSHIBA	IC1(=EAN34017608, MASK)
12	EAN34017505	IC,DRAWING	TMP87PM49N BIC328 TWIST ICEMAKER-PJT OTP SDIP ST 64P 8DMDEFN	TOSHIBA	IC1(=EAN34017606, MASK)
13	0IPKS30101A	IC,POWER MANAGEMENT	STR-S6358L SANKEN 5PIN TO220 ST SMPS 1 CHIP	SANKEN	IC2
14	0IPKM43001A	IC,POWER MANAGEMENT	PC925-1 NEC 4P,DIP BK 1 TLP762F	NEC	IC3,8
15	0IKE43100A	IC,KEC	KIA431 3 PIN TP - -	KEC	IC4
16	0IKE7805002	IC,LINEAR	KIA7805PI - - - -	KEC	IC5
17	0IKE6500330	IC,KEC	KID6500AF 16SOP BK 7CH DRIVER	KEC	IC6,7
17	0IST.U0006A	IC,TOSHIBA	ULN2003A TOSHIBA 16PIN0P TAPPING NPN TRARRAY	TOSHIBA	
18	0IKE7042000	IC,KEC	KIA7042P 2K/TP 4.2 RESET KEC - - - -	KEC	IC9
19	0IT0777400A	IC,DRAWING	TA7774AP 16,SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC10
20	0IRH52200A	IC,ROHM	BA6222 12SIP BK REVERSIBLE MOTOR DRIVER	ROHM	IC11
21	6520.B20056	RELAY	ALE15B12 MATSUSHITA 250VAC 15A 12VDC 1A NO VENTING	MATSUSHITA	RY1,4,6
	6520.B20056	RELAY	G5JS-1A-NT OMRON 250VAC 15A 12VDC 1A NO VENTING	OMRON	
	6520.B20055	RELAY	DHIU 11 DEC 250VAC 15A 12VDC 1A VENTING	DAIICHI	
22	6520.B20040	RELAY	DH12H-D-Q (JAPAN) DEC 250VAC 10A 12VDC 1A NO VENTING	DAIICHI	RY2(DOMESTIC)
	EBB52501	RELAY	OMH-SS-112LM QES 250VAC 12VDC 1A	TYCO	
23	6520.B20056	RELAY	ALE15B12 MATSUSHITA 250VAC 15A 12VDC 1A NO VENTING	MATSUSHITA	RY2(EXPORT)
	6520.B20056	RELAY	G5JS-1A-NT OMRON 250VAC 15A 12VDC 1A NO VENTING	OMRON	
	6520.B20055	RELAY	DHIU 11 DEC 250VAC 15A 12VDC 1A VENTING	DAIICHI	
24	6520.B20039	RELAY	G5N-1A(JAPAN) 250VAC 5A 12VDC 1A NO VENTING	OMRON	RY3,7,8,9,11
	6520.B20032	RELAY	ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6520.B20035	RELAY	G5NB-1A-E(CHINA)250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6520.B20037	RELAY	PCJ-112D3M(CHINA) 250VAC 3A 12VDC 1A NO VENTING	TYCO	
	6520W5A007A	RELAY	ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6520A90554B	RELAY	G5N-1A OMRON 250VAC 3A 12VDC 1A	OMRON	
25	6520.B20058	RELAY	G5SB-1A OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY5
	6520A90032A	RELAY	ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6520.B20039	RELAY	G5N-1A(JAPAN) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
25	6520.B20035	RELAY	G5NB-1A-E(CHINA)250VAC 5A 12VDC 1A NO VENTING	OMRON	RY10(PILOT)
	6520.B20037	RELAY	PCJ-112D3M(CHINA) 250VAC 3A 12VDC 1A NO VENTING	TYCO	
	6520W5A007A	RELAY	ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6520A90554B	RELAY	G5N-1A OMRON 250VAC 3A 12VDC 1A	OMRON	
26	6520AL7001A	RELAY	AJ70B2 NAIS 250VAC 16A 12VDC IC NO VENTING	NAIS	RY5
	EBB52550001	RELAY	OZ-SS-112LI AC240V DC12V 16A IC	TYCO	
	6520000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 15A 12VDC 1A NO VENTING	MASUSHITA	
27	6520.B20059	RELAY	G5JS-1A-NT OMRON 250VAC 15A 12VDC 1A NO VENTING	OMRON	RY14(EXPORT)
	6520.B20056	RELAY	DHIU 11 DEC 250VAC 15A 12VDC 1A VENTING	DAIICHI	
28	6520.B20040	RELAY	DH12H-D-Q (JAPAN) DEC 250VAC 10A 12VDC 1A NO VENTING	DAIICHI	RY14
29	6520.B20059	RELAY	G5SB-1A OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY12(H/BAR)
30	6520.B20059	RELAY	G5SB-1A OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY13
31	6420BA3041A	RESONATOR,CERAMIC	CSTLS4M00G53-A0 MURATA 4.00MHZ +/- 0.5% 7A 15PF	MURATA	OSC1
32	6102.BB001B	VARISTOR	SVC621D-1AA SAMWHA UL/VDE BK 620V TVR14621,INR14D621	SAM WHA, THINKING	VA1
32	6102.BB003A	VARISTOR	SVC271D-1AA SAMWHA UL/CSA/VDE TP TVR14271,INR14D271	SAM WHA, THINKING	VA1
33	0IR07000AA	DIODE,RECTIFIERS	FR107 TP DELTA D04I 1000V 1A 3	DELTA	D1,2,12,13,14,15
34	0IRSA00050A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D3
35	0IRSA00050A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D4
36	0IR06000AA	DIODE,RECTIFIERS	D3SBA60 BK SHINDENGEN 600V 4A	SHINDENGEN	BD1
37	0IR40040MA	DIODE,RECTIFIERS	IN4004 PYUNG CHANG TP26 D04I 400V 1A 30A 75NS SUA	DELTA,PYUNGCHANG	D6-9
37	0IR40040MA	DIODE,RECTIFIERS	IN4004 PYUNG CHANG TP26 D04I 400V 1A 30A 75NS SUA	DELTA,PYUNGCHANG	D16
38	0IR40070MA	DIODE,RECTIFIERS	IN4007 MOTOROLA TP D04I 600V 1.5A 60A 75NS 10UA	DELTA,PYUNGCHANG	D10
39	0IRM00188A	DIODE,ZENERS	RL2 ROHM R/TP LL(S)LL-34 500MW 5.6V 20MA .1%F	ROHM	ZD1,2,3,4,5,6
40	0IR14900BB	DIODE,SWITCHING	IN4148 TP ROHM D02S 75V 450MW	ROHM,PYUNGHANG	D11
41	0CE476Z06E0	CAPACITOR,FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN KLT,MXC,HW	RUBYCON,SAMWHA ,SAMYOUNG	CE1(105)
42	0CE68Z10E0	CAPACITOR,FIXED ELECTROLYTIC	68UF MXC 400V 20% BULK SNAP IN KLT,HE,HW	RUBYCON,SAMWHA ,SAMYOUNG	CE11(105)
43	0CE222K5GB	CAPACITOR,FIXED ELECTROLYTIC	222UF YXA 50V 20% FM5 TP 5 KME,RG,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE2(105)
44	0CE10KY1E0	CAPACITOR,FIXED ELECTROLYTIC	1000UF YXG 25V 20% FL BULK RX,KXL,LU	RUBYCON,SAMWHA ,SAMYOUNG	CE3(105)
45	0CE10KYJ5B	CAPACITOR,FIXED ELECTROLYTIC	1000UF 35V 20% FL BULK RX,KXL,YXG,LU	RUBYCON,SAMWHA ,SAMYOUNG	CE4(105)
46	0CE221BF63B	CAPACITOR,FIXED ELECTROLYTIC	220UF 16V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE5(85)
47	0CE221BH63B	CAPACITOR,FIXED ELECTROLYTIC	220UF 25V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE9,10(105)
48	0CE105BV63B	CAPACITOR,FIXED ELECTROLYTIC	1UF 50V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE13(85)
49	0CE107BH63B	CAPACITOR,FIXED ELECTROLYTIC	100UF 25V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE15(85)
50	0CE105BV63B	CAPACITOR,FIXED ELECTROLYTIC	1UF 50V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE6-8,11,12,14(85)
51	0CE105BV63B	CAPACITOR,FIXED ELECTROLYTIC	1UF 50V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE16(85) (WT-SNR)
52	0CK4730A96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	0.0047UF 2012 50V 80%,-20% R/TP X7R	MURATA	CC1
53	0CK2202510	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	220P 2KV K B S	SAM WHA	CC2
54	0CK2240K94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	220NF 2012 50V 80%,-20% F(Y5V) R/TP	MURATA	CC3
55	0CK1040K94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	100NF 2012 50V 80%,-20% R/TP F(Y5V)	MURATA	CC4-6,8,9,11
56	0CK223K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC7,10,12-16,18,20-28
57	0CK223K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC32 (WT-SNR)
58	0CK223K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC33
59	0CK1023K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	1NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC17,19
60	0CC224H8670	CAPACITOR,FIXED FILM	0.22UF D 275V 20% M/PP NI R	PILKOR	CH2
	0CC224Q8670	CAPACITOR,FIXED FILM	220NF 0.275V 20% BULK M/PP NI	PILKOR	CH4
61	0CC334Q8670	CAPACITOR,FIXED FILM	330NF 0.275V 20% BULK M/PP NI	PILKOR	CH5
62	0CC473N1470	CAPACITOR,FIXED FILM	0.047UF D 630V 0.05 BULK M/PP NI	PILKOR	CH3
63	0CC223N4N9	CAPACITOR,FIXED FILM	0.022 UF D 100V J PE TP	SAMWHA	CH4
64	EBR30756401	RESISTOR,SURGE	330K OHM 1 W 5% TAS2	SMART,CHOHYANG	R1(PRC TYOE)
65	EBR30745801	RESISTOR,SURGE	150K OHM 1/2 W 5% TAS2	SMART,CHOHYANG	R2(PRC TYPE)
66	EBR30666501	RESISTOR,SURGE	56K OHM 2 W 5.00% F20	SMART,CHOHYANG	R3(PRC TYPE)
67	0RD6801E609	RESISTOR,FIXED CARBON FILM	6.8K OHM 1/4 W 5.00% TAS2	SMART,CHOHYANG	R4
68	0RD5602E609	RESISTOR,FIXED CARBON FILM	56 OHM 1/4 W 5.00% TAS2	SMART,CHOHYANG	R5
69	0RD1001E609	RESISTOR,FIXED CARBON FILM	100 OHM 1/4 W 5.00% TAS2	SMART,CHOHYANG	R6
70	0RD6801E609	RESISTOR,FIXED CARBON FILM	680 OHM 1/4 W 5.00% TAS2	SMART,CHOHYANG	R6
71	0RW100J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	1 OHM 1 W 5% TAS2 (NON-INDUCTIVE)	SMART,CHOHYANG	ROOP
72	0RW220J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	0.56 OHM 1 W 5% TAS2 (NON-INDUCTIVE)	SMART,CHOHYANG	ROOP
73	0RD1806E609	RESISTOR,FIXED CARBON FILM	1.8K OHM 1/4 W 5.00% TAS2	SMART,CHOHYANG	R8
74	0RJ1001E672	RESISTOR,METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R29
75	EBR30966501	RESISTOR,SURGE	56K OHM 2 W 5.00% F20	SMART,CHOHYANG	R10(PRC TYPE)
76	0RD6802E609	RESISTOR,FIXED CARBON FILM	68 OHM 1/2 W 5.00% TAS2	SMART,CHOHYANG	R67
77	0RJ1001E672	RESISTOR,METAL GLAZED(CHIP)	100 OHM 1/8 W 5% 2012 R/TP	ROHM	R11
78	0RD1002E609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	R12
79	0RD4701E609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	R15,31,50
80	0RJ1002E672	RESISTOR,METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R9
81	0RJ1004E672	RESISTOR,METAL GLAZED(CHIP)	1M OHM 1/8 W 5% 2012 R/TP	ROHM	R14
82	0RJ1002E672	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 5% 2012 R/TP	ROHM	R16,18-23,39,46,55-57
83	0RJ4701E672	RESISTOR,METAL GLAZED(CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	R13,24,25,28,37,43,44
84	0RJ2001E672	RESISTOR,METAL GLAZED(CHIP)	2K OHM 1 / 8 W 5% 2012 R/TP	ROHM	R30,36,52,59,64
85	0RD2001E609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	R60,62,63,73,81
86	0RD2002E609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	R32-35,42,49,51,53,54,58
87	0RD1002E609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	RDR1
88	0RD1202E609	RESISTOR,FIXED CARBON FILM	12K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	RDR1
89	0RD8201E609	RESISTOR,FIXED CARBON FILM	8.2K OHM 1/4 W 5.00% TAS2	SMART,CHOHYANG	RDR1
90	0RD3901E609	RESISTOR,FIXED CARBON FILM	3.9K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	R38,45
91	0RJ1502E672	RESISTOR,METAL GLAZED(CHIP)	15K OHM 1/8 W 5% 2012 R/TP	ROHM	R75
92	0RD1501H609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/2 W 5% TAS2	SMART,CHOHYANG	R41,48
93	0RJ1622E472	RESISTOR,METAL GLAZED(CHIP)	16.2K OHM 1/8 W 1% 2012 R/TP	ROHM	RF1
94	0RN2232J409	RESISTOR,FIXED METAL FILM	15.2K OHM 1/4 W 1.00% TAS2	SMART,CHOHYANG	RIMI
95	0RN2612J409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TAS2	SMART,CHOHYANG	--
96	0RJ2612E472	RESISTOR,METAL GLAZED(CHIP)	26.1K OHM 1/8 W 1% 2012 R/TP	ROHM	RDJ,RR1,RR2
97	0RN1001J409	RESISTOR,FIXED METAL FILM	9.1K OHM 1/4 W 1.00% TAS2	SMART,CHOHYANG	RF2
98	0RN2401J409	RESISTOR,FIXED METAL FILM	2.4K OHM 1/4 W 1.00% TAS2	SMART,CHOHYANG	RF3
99	0RN1002J409	RESISTOR,FIXED METAL FILM	10K OHM 1/4 W 1.00% TAS2	SMART,CHOHYANG	RT1
100	0RN2612J409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TAS2	SMART,CHOHYANG	RM1(WT-SNR)
101	0RD1201E609	RESISTOR,FIXED CARBON FILM	1.2K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	(R)J1
102	0RD1201E609	RESISTOR,FIXED CARBON FILM	1.2K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	(R)J2
103	0RJ4702E672	RESISTOR,METAL GLAZED(CHIP)	47K OHM 1/8 W 5% 2012 R/TP	ROHM	R65,66
104	0RJ2001E672	RESISTOR,METAL GLAZED(CHIP)	2K OHM 1 / 8 W 5% 2012 R/TP	ROHM	R74
105	0RD4701E609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TAS2	SMART,CHOHYANG	R27
106	0RJ3302E672	RESISTOR,METAL GLAZED(CHIP)	330 OHM 1/8 W 5% 2012 R/TP	ROHM	R40,47
107	0RH4701L622	RESISTOR,METAL GLAZED(CHIP)	4.7KOHM 5% 1/8W 2012 R/TP	ROHM	R80
108	0CE106BX63B	CAPACITOR,FIXED ELECTROLYTIC	10UF 50V 20% FM5 TP 5 KME,RG,YXA,SM	RUBYCON,SAMWHA ,SAMYOUNG	CE12(85)
109	0TR1060059AF	TRANSISTOR,BIPOLARS	KRC106M KEC TP TO92M 50V 100MA	KEC	Q12
109	0TR2753390D	TRANSISTOR,BIPOLARS	KTA2753-Y (KTA5864A) TP KEC	KEC	Q11
110	0TR1060059AF	TRANSISTOR,BIPOLARS	KRC106M KEC TP TO92M 50V 100MA	KEC	Q10
111	0TRKE0000BA	TRANSISTOR,BIPOLARS	KEC KTB1151 BK TO126 60V 5A	KEC	Q2,4
112	0TR5886BAB	TRANSISTOR	KTC3198(KTC8151) KEC TP TO92 NA NA	KEC	Q3,5
113	0TR1060059AF	TRANSISTOR,BIPOLARS	KRC106M KEC TP TO92M 50V 100MA	KEC	Q1
114	6210.BB001A	FILTER(CIRC),EMC	BFS3510A0 SAMWHA 52 -	SAM WHA	FB1
115	6600H1100W	SWITCH,TACT	THVS020AA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
116	6600.BB003B	SWITCH,DIP	KSD03H OTAX 3P DIP 50V	OTAX	SW2
117	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	JD-13,15-18,,20-24,26-48
118	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	(R)JC1-JC44
119	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	GP1
120	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	(R)JP1
121	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	(R)JP2
122	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	(R)J1
123	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	(R)J2
124	6654B50001A	JUMP WIRE	0.6MM 152MM TP TAPING SN	DAE A LEAD	(R)JF1,JF2
125	6200.BB001B	FILTER(CIRC),EMC	120+0.1UF PILKOR - - -	PILKOR	CR1
126	6200.BB005B	FILTER(CIRC),EMC	01840050 TNC BK -	TNC	L1
127	6200.BB007X	FILTER(CIRC),EMC	UVH-05320 TNC BK 0.5A 320MH	TNC	L2
128	0LR0010M4F0	INDUCTOR,RADIAL LEAD	1000UH 20% R 6X12.5 BULK	TNC	L3,4
129	3.02447C	FUSE,DRAWING	15A 250V - EF	SAM JU	FUSE1
130	6901.BB001A	FUSE ASSEMBLY	KORE-PJT N/S	SAM JU	FUSE HOLDER

EXPLATION FOR MICOM CIRCUIT

<GW-P/L227: 88-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
116	0RJ1002E472	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 1% 2012 R/TP	ROHM	RT1
117	0RJ3901E672	RESISTOR,METAL GLAZED(CHIP)	3.9K OHM 1/8 W 5% 2012 R/TP	ROHM	R38,45
118	0RJ2001E672	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R52,58
119	0RJ2001E672	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R36,80
120	0RJ1502E672	RESISTOR,METAL GLAZED(CHIP)	15.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R81
121	6210.BB001A	FILTER(CIRC),EMC	BFS3510A0 SAMWHA 52 -	SAM WHA	FB1
122	0TR1273094D	TRANSISTOR,BIPOLARS	KTA1273-Y PNP -5V -30V -2A 1W TP 3P KEC CORPERATION	KEC	Q11
123	0TRKE00008A	TRANSISTOR,BIPOLARS	KEC KTB1151 BK TO126 60V 5A	KEC	Q2,4
124	0TR3198094B	TRANSISTOR	KTC3198(KTC1815) KEC TP TO92 NA NA	KEC	Q3,5
125	0TR1060094C	TRANSISTOR	KRA 106M(KRA2206) KEC TP TO92M 50V 100MA	KEC	Q6
126	0TR1060094F	TRANSISTOR	KRC 106M KEC TP TO92M 50V 100MA	KEC	Q7,10
127	6600RRT001W	SWITCH,TACT	THVV502GAA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
128	6600.BB003B	SWITCH,DIP	KSD02H OTAX NONE NONE 2P DIP S/W	OTAX	SW2
129	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	J01-52
130	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
131	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	JP1
132	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
133	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J1
134	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J2
135	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J3
136	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J4
137	6654B50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	JF1,JF2
138	6908.JB3002A	BUZZER	BM-20K BUJEON PIEZO 2KHZ 80DB	BUJEON	BUZZER
139	6200.JB001B	FILTER(CIRC),EMC	120+0.1UF PILKOR - -	PILKOR	CR1
140	6200.JB009B	FILTER(CIRC),EMC	CH9400150 TNC BK -	TNC	L1
141	6200.JB007X	FILTER(CIRC),EMC	UY1I-05320 TNC BK 0.5A 320MH	TNC	L2
142	0LR100M4F0	INDUCTOR,RADIAL LEAD	10000UH 20% R 6X12.5 BULK	TNC	L3,4
143	3J02447C	FUSE,DRAWING	15A 250V - EF	SAM JU	FUSE1
144	6901.JB001A	FUSE ASSEMBLY	KORE-PJT N/S	SAM JU	FUSE HOLDER
145	0FS5001E502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LD/GL UL / CSA	SAM JU	FUSE2
146	0001030F	CONNECTOR (CIRC),WAFER	GP88119I-2 HAN KUK DAN JA NA NA NA	KET	-
147	4920.JE3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-564,65,73 2PIN 1-SCREW 3MM	TAE SUNG, PHOTOSELL	(IC2)
148	1S9F030241B	SCREW TAP TITE(S),BINDING HEAD	+ D3.0 L8.0 MSWR3/FZY	TAE SUNG, PHOTOSELL	(IC2)
149	S50000008A	SOLDER(ROSIN WIRE) RSO	SR-34 PB FREE, LFM-48	-	-
150	S5WZU-L05AA	SOLDER,SOLDERING	LFM-36, SN 3.0MG-0.50% 3.0MM	HEE SUNG	-
151	7245ZB0004A	FLUX	SV-RSF-06 KSK 12.5 MTK 0.815+-0.003	KOKI	-
152	0027M0018BA	DIODE,ZENERS	RLZ ROHM R/TP LLDS(LL-34) 500MW 5.6V 20MA .PF	ROHM	ZD1,2,3,4
153	6630V9021IA	CONNECTOR (CIRC),WAFER	1743330-1 2P 11.00MM IR STRAIGHT DIP BK NATURAL AMP	AMP	CON201
154	0RD2400HE09	RESISTOR,FIXED CARBON FILM	240 OHM 1/2 W 5% TA52	SMART,CHOHYANG	R31
155	0DD400409AA	DIODE,RECTIFIERS	IN4004 PYUNG CHANG TP26 DO41 400V 1A 30A 75NS SUA	DELTA,PYUNGCHANG	D16
156	0CE105BK63B	CAPACITOR,FIXED ELECTROLYTIC	1UF KME,RG 50V 20% FMS TP 5 (YXA/SM)	SAMYOUNG/SAMHWA(RUBYCON)	CE19(85)

EXPLATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	EAX52477701	PWB(PCB)	BUCKINGHAM-PJT NON-M/ROOM VER-7	DOO SAN	T-1,6(NON-MAGIC ROOM)
2	6170.B2013C	TRANSFORMER,SMPS(COIL)	C02/CH-PJT DELUXE N/S	SAM IL, SMC	TRANS
3	6170.B2013D	TRANSFORMER,SMPS(COIL)	C02/CH-PJT DELUXE 100-127V	SAM IL, SMC	TRANS
4	6630M002509	CONNECTOR (CIRC),WAFER	YW396 YEONHO 9P 3.96MM (9P-2,4,6,8)	YEON HO	CON2
5	6630M001509	CONNECTOR (CIRC),WAFER	YW396 YEONHO 9P 3.96MM YW396-09AV RED	YEON HO	CON4
6	6630M002707	CONNECTOR (CIRC),WAFER	YW396 YEONHO 7P 3.96MM (7P-2,4,6)	YEON HO	CON1
7	6630M00111	CONNECTOR (CIRC),WAFER	YW396 YEONHO 11P 3.96MM YW396-11AV (11P-2,4,6,8,10)	YEON HO	CON3
8	6630.B8007N	CONNECTOR (CIRC),WAFER	917789-1 AMP 12P 2.5MM STRAIGHT SN	AMP	CON5
9	6630.B8007J	CONNECTOR (CIRC),WAFER	917788-1 AMP 10P 2.5MM STRAIGHT SN	AMP	CON8
10	6630.B8007L	CONNECTOR (CIRC),WAFER	917790-1 AMP 12P 2.5MM STRAIGHT SN	AMP	CON6
11	6630.B8010A	CONNECTOR (CIRC),WAFER	917791-1 AMP 13P 2.5MM STRAIGHT SN	AMP	CON7
12	6630.B8007E	CONNECTOR (CIRC),WAFER	917784-1 AMP 6P 2.5MM STRAIGHT SN	AMP	CON9
13	EAN37284003	IC,DRAWING	TMP87PM1N 64P SDIP ST OTP BUCKINGHAM-PJT BAR DLX BDMDEFN	TOSHIBA	IC1 (=EAN37284004_MASK)
13	EAN37284001	IC,DRAWING	TMP87PM1N 64P SDIP ST OTP GR-00 BUCKINGHAM-PJT BAR DLX GPOR	TOSHIBA	IC1 (=EAN37284002_MASK)
13	0IZZ.B****	IC,DRAWING	TMP87PM1N 64P SDIP ST OTP BUCKINGHAM-PJT BAR DLX BDMDEFN ****	TOSHIBA	IC1
13	0IZZ.B****	IC,DRAWING	TMP87PM1N 64P SDIP ST OTP GR-00 BUCKINGHAM-PJT BAR DLX GPOR ****	TOSHIBA	IC1
13	0IZZ.B****	IC,DRAWING	TMP87PM1N 64P SDIP ST OTP BUCKINGHAM-PJT BAR DLX BDMDEFN SAA	TOSHIBA	IC1
13	0IZZ.B****	IC,DRAWING	TMP87PM1N 64P SDIP ST OTP GR-00 BUCKINGHAM-PJT BAR DLX GPOR INDIA	TOSHIBA	IC1
14					
15					
16	0IPMDSK001A	IC,POWER MANAGEMENT	STR-S6351L SANKEN SPIN TO220 ST SMPS I CHIP	SANKEN	IC2
17	0IPMGNE001A	IC,POWER MANAGEMENT	PS2561-1 NEC 4P,DIP BK : TLP762JF	NEC	IC3,8
18	0IKE4390004	IC,KEC	KIA431 3 PIN TP - -	KEC	IC4
19	0IKE7805004	IC,LINEAR	KIA7805PI - - - -	KEC	IC5
	0IKE7805002	IC,LINEAR	KIA7805PI - - - -	KEC	
20	0IKE6500310C	IC,KEC	KID65003AF 16SOP BK 7CH DRIVER	KEC	IC6,7
	0IST1L000564	IC,TOSHIBA	LD1A203A TOSHIBA 16PINSOP TAPING NPN TRARRAY	TOSHIBA	
21	0IKE7042000	IC,KEC	KIA7042P 2V/TP 4.2 RESET KEC - - - -T	KEC	IC9
22	0IT07774A0A	IC,DRAWING	TA7774AP 16,SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC10
23	0IRH622200A	IC,ROHM	BA6222 10SIP BK REVERSIBLE MOTOR DRIVER	ROHM	IC11
24	0IRH534600D	IC,ROHM	BR93L046RF-W 8PIN SOP BK EEPROM	ROHM	IC12
	0IS5334650	IC,SGS-THOMSON	M58LC46-WNS1 8PIN TP AUTO RESTART SMD	SGS_THOMSON	
25	0IST1M1001A	IC,STANDARD LOGIC	M54563FP MITSUBISHI 20 P/TP CONVERT	MITSUBISHI	IC13
26	0IKE6500310C	IC,KEC	KID65003AF 16SOP BK 7CH DRIVER	KEC	IC14
	0IST1L000564	IC,TOSHIBA	LD1A203A TOSHIBA 16PINSOP TAPING NPN TRARRAY	TOSHIBA	
27	6920.000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MATSUSHITA	RY1,4,6
	6920.B2003B	RELAY	G5J5-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING	OMRON	
	6920.B2005C	RELAY	OHIU II DEC 250VAC 16A 12VDC 1A VENTING	JAIL	
	EBR572501	RELAY	OMH-SS-112LM DEC AC240V DC12V 16A 1A DIP DES	TYCO	
28	6920.B2004D	RELAY	CH12D1-D-0 (JAPAN) DEC 250VAC 10A 12VDC 1A NO VENTING	JAIL	RY2
29	6920.000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MATSUSHITA	RY2(EXPORT)
	6920.B2003B	RELAY	G5J5-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING	OMRON	
	6920.B2005C	RELAY	OHIU II DEC 250VAC 16A 12VDC 1A VENTING	JAIL	
	EBR572501	RELAY	OMH-SS-112LM DEC AC240V DC12V 16A 1A DIP DES	TYCO	
30	6920.000002A	RELAY	ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	RY3,7,8,9,11
	6920.B2003A		G5N-1A (JAPAN) 250VAC 1.5A 12VDC 1A	OMRON	
	6920.B2003D		G5NB-1A-E (JAPAN) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003E		G5NB-1A-E (CHINA) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003F		PCJ-112D3MH (CHINA) 250VAC 3A 12VDC 1A NO VENTING	TYCO	
	6920M5A007A		ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6920A905548		G5N-1A OMRON 250VAC 3A 12VDC 1A	OMRON	
31	6920A900002A	RELAY	ALDI12(JAPAN) 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	RY10(PILOT)
	6920.B2003A		G5N-1A(JAPAN) 250VAC 1.5A 12VDC 1A	OMRON	
	6920.B2003D		G5NB-1A-E(JAPAN) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003E		G5NB-1A-E(CHINA) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003F		PCJ-112D3MH(CHINA) 250VAC 3A 12VDC 1A NO VENTING	TYCO	
	6920M5A007A		ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6920A905548		G5N-1A OMRON 250VAC 3A 12VDC 1A	OMRON	
32	6920.B2005B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC IC NO VENTING	OMRON	RY14(PIPE HEATER)
33	6920A900002A	RELAY	ALDI12(JAPAN) 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	RY14(DISP'-LAMP/F-LAMP)
	6920.B2003A		G5N-1A(JAPAN) 250VAC 1.5A 12VDC 1A	OMRON	
	6920.B2003D		G5NB-1A-E(JAPAN) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003E		G5NB-1A-E(CHINA) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003F		PCJ-112D3MH(CHINA) 250VAC 3A 12VDC 1A NO VENTING	TYCO	
	6920M5A007A		ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6920A905548		G5N-1A OMRON 250VAC 3A 12VDC 1A	OMRON	
34	6920AL700A	RELAY	ALZ2312 NAIS 250VAC 16A 12VDC IC NO VENTING	NAIS	RY5
	EBR572501	RELAY	OZ-SS-112L1 AC240V DC12V 16A IC DIP TYCO	TYCO	
35	6920.B2005B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY12(H/BAR)
36	6920.B2003E	RELAY	G5NB-1A-E(CHINA) 250VAC 5A 12VDC 1A NO VENTING	OMRON	RY12(F-LAMP)
	6920A900002A		ALDI12(JAPAN) 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
	6920.B2003A		G5N-1A(JAPAN) 250VAC 1.5A 12VDC 1A	OMRON	
	6920.B2003D		G5NB-1A-E(JAPAN) 250VAC 5A 12VDC 1A NO VENTING	OMRON	
	6920.B2003F		PCJ-112D3MH(CHINA) 250VAC 3A 12VDC 1A NO VENTING	TYCO	
	6920M5A007A		ALDI12 MATSUSHITA 250VAC 3A 12VDC 1A NO VENTING	MATSUSHITA	
37	6920.B2005B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY13
38	6212BA304IA	RESONATOR,CERAMIC	CSTLS4M00G53-A0 MURATA 4.00MHZ +/- 0.5% TA 15PF	MURATA	OSC1
39	6102.B8001B	VARISTOR	INR14D621 , SVC621D-14A , TNR14G2	SAMWHA	VAI
40	EAF36147201	VARISTOR	SVC391-14D 390V 10% UL/CSA/VDE KINK TP SAMWHA	SAMWHA	VAI
41	0DRI07009AA	DIODE,RECTIFIERS	FR107 TP DELTA 0.04I 1000V IA 3	DELTA	D1,2,12,13,14,15
42	0DRSA00030A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D3
43	0DRSA00030A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D4
44	0DEB60020AA	DIODE,RECTIFIERS	D3SBA60 BK SHINDENGEN 600V 4A	SHINDENGEN	BD1
45	0DD4004039A	DIODE,RECTIFIERS	IN4004 PYUNG CHANG TP26 0.04I 400V IA 30A 75NS SUA	DELTA,PYUNGCHANG	D5-9
46	0DD4007039A	DIODE,RECTIFIERS	IN4007 MOTOROLA TP 0.04I 600V 1.5A 60A 75NS 10UA	DELTA,PYUNGCHANG	D10
47	0DD4148039A	DIODE,SWITCHING	IN4148 ROHM TP26 DO35 100V 450MA 2A 3NS SUA	ROHM,PYUNGHANG	D11
48	0DCE450J683D	CAPACITOR,FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN (KL1/A0C/HH)	SAMHWA(SAMYOUNG/YUBYCON)	CE1(105)
49	0DCE680J683D	CAPACITOR,FIXED ELECTROLYTIC	68UF HE 400V 20% BULK SNAP IN (KL1/A0C/HH)	SAMHWA(SAMYOUNG/YUBYCON)	CE1(105)
50	0DC226EK63B	CAPACITOR,FIXED ELECTROLYTIC	22UF KME 50V 20% FM5 TP 5 (RG/YXA/SM)	SAMYOUNG(SAMHWA/YUBYCON)	CE2(105)
51	0DE1081H610	CAPACITOR,FIXED ELECTROLYTIC	1000UF RX 25V 20% FL BULK (KXL/YXG/LU)	SAMHWA(SAMYOUNG/YUBYCON)	CE3(105)
52	0DE1081K61B	CAPACITOR,FIXED ELECTROLYTIC	1000UF RX 35V 20% FL BULK (KXL/YXG/LU)	SAMHWA(SAMYOUNG/YUBYCON)	CE4(105)
53	0DC227SF63B	CAPACITOR,FIXED ELECTROLYTIC	220UF KME 16V 20% FM5 TP 5 (RG/YXA/SM)	SAMYOUNG(SAMHWA/YUBYCON)	CE5(85)
54	0DC227EH63B	CAPACITOR,FIXED ELECTROLYTIC	220UF KME,RG 25V 20% FM5 TP 5 (YXA/SM)	SAMYOUNG/SAMHWA(RUBYCON)	CE9,10(105)
55	0DC1R5EK63B	CAPACITOR,FIXED ELECTROLYTIC	1UF KME,RG 50V 20% FM5 TP 5 (YXA/SM)	SAMYOUNG/SAMHWA(RUBYCON)	CE13(85)
56	0DC102EH63B	CAPACITOR,FIXED ELECTROLYTIC	1000UF KME,RG 25V 20% FM5 TP 5 (YXA/SM)	SAMYOUNG/SAMHWA(RUBYCON)	CE15(85)
57	0DC106EK63B	CAPACITOR,FIXED ELECTROLYTIC	10UF KME 50V 20% FM5 TP 5 (RG/YXA/SM)	SAMYOUNG(SAMHWA/YUBYCON)	CE6-8,11,12,14(85)
58	0DC476EH63B	CAPACITOR,FIXED ELECTROLYTIC	47UF KME,RG 25V 20% FM5 TP 5	SAMYOUNG/SAMHWA(RUBYCON)	CE16(85)
59	0DC108EK63B	CAPACITOR,FIXED ELECTROLYTIC	10UF KME 50V 20% FM5 TP 5 (RG/YXA/SM)	SAMYOUNG(SAMHWA/YUBYCON)	CE18(85) (WT-SNR)
60	0DX4700K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	0.0047UF 2012 50V 80%,-20% R/TP X7R	MURATA	CD1
61	0DX2102S10	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	2200P 2KV K B S	SAMWHA	CD2
62	0DX2240K94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	220NF 2012 50V 80%,-20% F(Y5V) R/TP	MURATA	CD3
63	0DX1040K94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	100NF 2012 50V 80%,-20% R/TP F(Y5V)	MURATA	CD4-6,8,9,11,30
64	0DX2230K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CD7,10,12-15,18,20-28
65	0DX2230K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CD32 (WT-SNR)
66	0DX1002K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	1NF 2012 50V 80%,-20% R/TP X7R	MURATA	CD17,19,31
67	0DX2230K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CD29
68	0DF2241B570	CAPACITOR,FIXED FILM	0.22UF D 275V 20% M/PP NI R	PILKOR	CM2
	0DF2240B670	CAPACITOR,FIXED FILM	220NF 0 275V 20% BULK M/PP NI	PILKOR	
69	0DF3940B670	CAPACITOR,FIXED FILM	330NF 0 275V 20% BULK M/PP NI	PILKOR	CM1
70	0DF473H470	CAPACITOR,FIXED FILM	0.047UF D 630V 0.05 BULK M/PP NI	PILKOR	CM3
71	0DZZ2IN429	CAPACITOR,FIXED FILM	0.022 UF D 100V 2% TP	SAMWHA	CM4
72	EBC3206640	RESISTOR,SURGE	330K OHM 1 W 5% TA52	SMART,CHOHYANG	R1(PRC TYPE)
73	EBC3224501	RESISTOR,SURGE	560K OHM 1/2 W 5% TA52	SMART,CHOHYANG	R2(PRC TYPE)
74	EBC3226501	RESISTOR,SURGE	56K OHM 2 W 5,00% F20	SMART,CHOHYANG	R3(PRC TYPE)
75	0RD6801E609	RESISTOR,FIXED CARBON FILM	6.8K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R4
76	0RD8201E609	RESISTOR,FIXED CARBON FILM	82 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R5
77	0RD1000E609	RESISTOR,FIXED CARBON FILM	100 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R5
78	0RD6800E609	RESISTOR,FIXED CARBON FILM	680 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R6
79	0RM0101J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	1 OHM 1 W 5% TA52 (NON-INDUCTIVE)	SMART,CHOHYANG	ROOP
80	0RW0560J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	0.56 OHM 1 W 5% TA52 (NON-INDUCTIVE)	SMART,CHOHYANG	ROOP
81	EBC3206250	RESISTOR,SURGE	56K OHM 2 W 5,00% F20	SMART,CHOHYANG	R101(PRC TYPE)
82	0RD6801E609	RESISTOR,FIXED CARBON FILM	68 OHM 1/2 W 5.00% TA52	SMART,CHOHYANG	R67
83	0RD1200H609	RESISTOR,FIXED CARBON FILM	120 OHM 1/2 W 5% TA52	SMART,CHOHYANG	R29,30
84	0RJ1622E472	RESISTOR,FIXED CARBON FILM	16.2KOHM 1% 1/8W 2012 R/TP	SMART,CHOHYANG	RF1
85	0RD2001E609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R21,22,32-34,53-54,63,64
86	0RD4701E609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R72 (WT-SNR)
87	0RD1002E609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	-
88	0RD2202E609	RESISTOR,FIXED CARBON FILM	12K OHM 1/4 W 5% TA52	SMART,CHOHYANG	-
89	0RD8202E609	RESISTOR,FIXED CARBON FILM	8.2K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	-
90	0RJ3300E672	RESISTOR,FIXED CARBON FILM	330 OHM 5% 1/8W 2012 R/TP	ROHM	R40
91	0RD5001H609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/2 W 5% TA52	SMART,CHOHYANG	R41,48
92	0RD2001E609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R35,42,49,51,59,60,62
93	0RN6252J409	RESISTOR,FIXED METAL FILM	16.2K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RMI
94	0RN2001G409	RESISTOR,FIXED CARBON FILM	2K OHM 1% 1/4W 6.5X2.3MM - AXIAL TA52	SMART,CHOHYANG	(R)J1
95	0RN1201G409	RESISTOR,FIXED CARBON FILM	1.2K OHM 1% 1/4W 6.5X2.3MM - AXIAL TA52	SMART,CHOHYANG	(R)J2
96	0RN1201G409	RESISTOR,FIXED CARBON FILM	1.2K OHM 1% 1/4W 6.5X2.3MM - AXIAL TA52	SMART,CHOHYANG	(R)J3
97	0RN1201G409	RESISTOR,FIXED CARBON FILM	1.2K OHM 1% 1/4W 6.5X2.3MM - AXIAL TA52	SMART,CHOHYANG	(R)J4
98	0RD4701E609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R9,20,43,50,61
99	0RJ180JE672	RESISTOR,METAL GLAZED(CHIP)	1.8K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R8
100	0RJ1000E672	RESISTOR,METAL GLAZED(CHIP)	100 OHM 1/8 W 5% 2012 R/TP	ROHM	R11,23
101	0RJ1002E672	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 5% 2012 R/TP	ROHM	R12,39,45,55,56,57
102	0RJ470JE672	RESISTOR,METAL GLAZED(CHIP)	47K OHM 1/8 W 5% 2012 R/TP	ROHM	R15,65,66
103	0RJ100JE672	RESISTOR,METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R26,27
104	0RJ2200E672	RESISTOR,METAL GLAZED(CHIP)	220 OHM 1/8 W 5% 2012 R/TP	ROHM	R77
105	0RJ100JE672	RESISTOR,METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R3
106	0RJ1004E672	RESISTOR,METAL GLAZED(CHIP)	1M OHM 1/8 W 5% 2012 R/TP	ROHM	R14
107	0RJ470JE672	RESISTOR,METAL GLAZED(CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	R24,25,28,37,44,73-76,78,82
108	0RJ2612E472	RESISTOR,METAL GLAZED(CHIP)	26.1K OHM 1/8 W 1.00% 2012 R/TP	ROHM	RD1,RR2
109	0RJ910JE472	RESISTOR,METAL GLAZED(CHIP)	9.1K OHM 1/8 W 1.00% 2012 R/TP	ROHM	RF2
110	0RJ240JE472	RESISTOR,METAL GLAZED(CHIP)	2.4K OHM 1/8 W 1.00% 2012 R/TP	ROHM	RF3
111	0RJ2612E472	RESISTOR,METAL GLAZED(CHIP)	26.1K OHM 1/8 W 1.00% 2012 R/TP	ROHM	RMI
113	0RJ330JE672	RESISTOR,METAL GLAZED(CHIP)	330 OHM 1/8 W 5% 2012 R/TP	ROHM	R47
114	0RJ100JE672	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 5% 2012 R/TP	ROHM	CD32(WT-SNR)
115	0RJ2612E472	RESISTOR,METAL GLAZED(CHIP)	26.1K OHM 1/8 W 1% 2012 R/TP	ROHM	RR1

EXPLATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
116	0RJ1002E472	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 1% 2012 R/TP	ROHM	R11
117	0RJ390IE672	RESISTOR,METAL GLAZED(CHIP)	3.9K OHM 1/8 W 5% 2012 R/TP	ROHM	R38,45
118	0RJ200IE672	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R52,58
119	0RJ200IE672	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R35,60
120	0RJ1502E672	RESISTOR,METAL GLAZED(CHIP)	15.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R81
121	6210.JB800IA	FILTER(CIRC),EMC	BFC3510A0 SAMWHA 52 -	SAM WHA	FB1
122	0TR127309A0	TRANSISTOR,BIPOLARS	KTA1273-Y PNP -5V -30V -2A 1W TP 3P KEC CORPERATION	KEC	Q11
123	0TRKC0009A	TRANSISTOR,BIPOLARS	KEC KTB1151 BK TO126 60V 5A	KEC	Q2,4
124	0TR319B09AB	TRANSISTOR	KTC3198(KTC1815) KEC TP TO92 NA NA	KEC	Q3,5
125	0TRI06009AC	TRANSISTOR	KRA 106M(KRA2206) KEC TP TO92M 50V 100MA	KEC	Q6
126	0TRI06009AF	TRANSISTOR	KRC 106M KEC TP TO92M 50V 100MA	KEC	Q7,10
127	6600RRT00IW	SWITCH,TACT	THMV502GAA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
128	6600.JB8003B	SWITCH,DIP	KSD02H OTAX NONE NONE 2P DIP S/W	OTAX	SW2
129	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	J01-52
130	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
131	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	JP1
132	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
133	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J1
134	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J2
135	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J3
136	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J4
137	6854B5000IA	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	JF1,JF2
138	6908.JB3002A	BUZZER	BM-20K BUJEON PIEZO 2KHZ 80DB	BUJEON	BUZZER
139	6200.JB800IB	FILTER(CIRC),EMC	120+0.1UF PILKOR - -	PILKOR	CR1
140	6200.JB8009B	FILTER(CIRC),EMC	CH940050 TNC BK -	TNC	L1
141	6200.JB8007X	FILTER(CIRC),EMC	UY1T-05320 TNC BK 0.5A 320MH	TNC	L2
142	0LR100IM4F0	INDUCTOR,RADIAL LEAD	10000UH 20% R 6X12.5 BULK	TNC	L3,4
143	3J02447C	FUSE,DRAWING	15A 250V - EP	SAM JU	FUSE1
144	6901.JB800IA	FUSE ASSEMBLY	KORE-PJT N/S	SAM JU	FUSE HOLDER
145	0F3500IB502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LD/GL UL / CSA	SAM JU	FUSE2
146	000I030F	CONNECTOR (CIRC),WAFER	GP88119I-2 HAN KUK DAN JA NA NA NA	KET	-
147	4920.JE3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-S64,65,73 2PIN 1-SCREW 3MM	TAE SUNG, PHOTOSELL	(IC2)
148	1S8F030241B	SCREW TAP TITE(S),BINDING HEAD	+ D3.0 L8.0 MSWRS/FZY	TAE SUNG, PHOTOSELL	(IC2)
149	SS0000008A	SOLDER(ROSIN WIRE) RSO	SR-34 PB FREE, LFM-48	-	-
150	SSWZU-L05AA	SOLDER,SOLDERING	LFM-38, SN 3.0AG-0.5CU% 3.0MM	HEE SUNG	-
151	7245ZB0004A	FLUX	SV-RBF-06 KSK 12.5 WT% 0.865+-0.003	KOKI	-
152	0DZFMD01B9A	DIODE,ZENERS	RLZ ROHM R/TP LLDS(LL-34) 500MW 5.6V 20MA .PF	ROHM	ZD1,2,3,4
153	6630V9021IA	CONNECTOR (CIRC),WAFER	1743330-1 2P 11.00MM IR STRAIGHT DIP BK NATURAL AMP	AMP	CON201
154	0RD2400H609	RESISTOR,FIXED CARBON FILM	240 OHM 1/2 W 5% TA52	SMART,CHOHYANG	R31
155	0DD400409AA	DIODE,RECTIFIERS	IN4004 PYUNG CHANG TP26 D041 400V 1A 30A 75NS 5UA	DELTA,PYUNGCHANG	DI6
156	0CE105BK63B	CAPACITOR,FIXED ELECTROLYTIC	1UF KME,RG 50V 20% FMS TP 5 (YXA/SM)	SAMYOUNG/SAMHWA(RUBYCON)	CE19(B5)

EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	6870JB820IA	PWB(PCB)	VIKING-PJT BEST BASIC VER-1	DOOSAN	T-1.6
1	6870JB820IB	PWB(PCB)	VIKING-PJT BEST BASIC M/ROOM VER-1	DOOSAN	T-1.6
2	6170JB2012A	TRANSFORMER,SMPS[COIL]	DL-PJT 2.9MH/20W	SAM IL, SMC	TRANS
2	6170JB2012C	TRANSFORMER,SMPS[COIL]	GR-B217/257*A(G) BLDC 100-127V	SAM IL	TRANS
3	6630VM0IIII	CONNECTOR (CIRC),WAFER	YW396 YEON-HO 11P 3.96MM YW396-11AV (11P-2,4,6,8,10)	YEON-HO	CON2
4	6630VM02707	CONNECTOR (CIRC),WAFER	YW396 YEON-HO 7P 3.96MM (7P-2,4,6)	YEON-HO	CON3
5	6630JB8007E	CONNECTOR (CIRC),WAFER	9177B4-1 AMP 6P 2.5MM STRAIGHT SN	AMP	CON4
6	6630JB8007L	CONNECTOR (CIRC),WAFER	917790-1 AMP 12P 2.5MM STRAIGHT SN	AMP	CON5
7	6630JB8010A	CONNECTOR (CIRC),WAFER	917791-1 AMP 13P 2.5MM STRAIGHT SN	AMP	CON6
8	0IZZJB2058T	IC,DRAWING	TMP87PM41N 64P SDIP ST OTP VIKING-PJT BEST GPOR	TOSHIBA	IC1
8	0IZZJB2058U	IC,DRAWING	TMP87PM41N 64P SDIP ST OTP VIKING-PJT BEST IBOMDEFN	TOSHIBA	IC1
9	0IPMGSK00IA	IC,POWER MANAGEMENT	STR-G6351L SANKEN 5PIN TO220 ST SMPS I CHIP	SANKEN	IC2
10	0IPMGNE00IA	IC,POWER MANAGEMENT	PS2561-1 NEC 4P,DIP BK : TLP762J,F	NEC	IC3
11	0IKE431000A	IC,KEC	KIA431 3 PIN TP - -	KEC	IC4
12	0IKE780500Z	IC,LINEAR	KIA7805PI - - - -	KEC	IC5
13	0IKE650030C	IC,KEC	KID65003AF 16SOP BK 7CH DRIVE	KEC	IC6
14	0IKE704200A	IC,KEC	KIA7042P KEC 3P BK RESET	KEC	IC7
15	0IIT0777400A	IC,DRAWING	TA7774AP 16,SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC8
16	6920000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MATSUSHITA	RY1,6
	6920JB2005B	RELAY	G5JS-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING 3	OMRON	
	6920JB2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC 1A VENTING	DAIICHI	
17	6920JB2004D	RELAY	DHI20I-0-Q (JAPAN) DEC 250VAC 10A 12VDC 1A	DAIICHI	RY2
18	6920000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MATSUSHITA	RY2(EXPORT)
	6920JB2005B	RELAY	G5JS-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING 3	OMRON	
	6920JB2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC 1A VENTING	DAIICHI	
18	6920JB2004E	RELAY	G5NB-1A-E(CHINA) OMRON 250VAC 5A 12VDC 1A NO VENTING	OMRON	
19	6920JB2009B	RELAY	G5EB-14 OMRON 250VAC 5A 12VDC 1C NO-VENTING	OMRON	RY3(H/BAR)
20	6920JB2004D	RELAY	DHI20I-0-Q (JAPAN) DEC 250VAC 10A 12VDC 1A	DAIICHI	RY4
21	6920000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MATSUSHITA	RY4(EXPORT)
	6920JB2005B	RELAY	G5JS-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING 3	OMRON	
	6920JB2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC 1A VENTING	DAIICHI	
21	6920JB2004E	RELAY	G5NB-1A-E(CHINA) OMRON 250VAC 5A 12VDC 1A NO VENTING	OMRON	
22	6920ALZ001A	RELAY	ALZ12B12 NAIS 250VAC 16A 12VDC 1C NO VENTING	NAIS	RY5
23	6212BA3041A	RESONATOR,CERAMIC	CSTLS4M00G53-A0 MURATA 4.00MHZ +/- 0.5% TA 15PF	MURATA	OSC1
24	6102JB800IA	VARISTOR	SVC621D-14A SAMWHA UL/VDE BK 620V	SAM WHA, ILJIN	VA1
24	6102W5V006A	VARISTOR	SVC271D-14A SAMWHA UL/CSA/VDE TP	SAM WHA, ILJIN	VA1
25	0DR107009AA	DIODE,RECTIFIERS	FR107 TP DELTA D04I 1000V 1A 3	DELTA	D1,2,9-12
26	0DRSA00090A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D3
26	0DRSD001I0A	DIODE,RECTIFIERS	S3L40 SHINDENGEN BK AXI4 400V 1.8A 60A 50NSEC 10UA	SHINDENGEN	D3
27	0DRSA00090A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SAMKEN	D4
27	0DRSD001I0A	DIODE,RECTIFIERS	S3L40 SHINDENGEN BK AXI4 400V 1.8A 60A 50NSEC 10UA	SHINDENGEN	D4
28	0DB360000AA	DIODE,RECTIFIERS	D3SBA60 BK SHINDENGEN 600V 4A	SHINDENGEN	BD1
29	0DD400409AC	DIODE,RECTIFIERS	RECTIN4004 TP	DELTA,PYUNGCHANG	D5,6,8
30	0DD400409AC	DIODE,RECTIFIERS	RECTIN4004 TP	DELTA,PYUNGCHANG	D7
31	0CE476ZV6E0	CAPACITOR,FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN	RUBYCON,SAMWHA	CE1(105)
31	0CE476ZV6E0	CAPACITOR,FIXED ELECTROLYTIC	HW 450V-47UF M (22*20) LUG	G-LUXON(MTI)	CE1(105)
32	0CE686ZU6E0	CAPACITOR,FIXED ELECTROLYTIC	68UF MXC 400V 20% BULK SNAP IN	RUBYCON,SAMWHA	CE1(105)
32	0CE686ZU6E0	CAPACITOR,FIXED ELECTROLYTIC	HW 400V-68UF M (22*25) LUG	G-LUXON(MTI)	CE1(105)
33	0CE226ZK638	CAPACITOR,FIXED ELECTROLYTIC	22UF YXA 50V 20% FM5 TP 5	RUBYCON,SAMWHA	CE2(105)
33	0CE226ZK638	CAPACITOR,FIXED ELECTROLYTIC	SM 50V-22UF M (5*11) T/P5	G-LUXON(MTI)	CE2(105)
34	0CE108ZH6I0	CAPACITOR,FIXED ELECTROLYTIC	1000UF YXG 25V 20% FL BULK	RUBYCON,SAMWHA	CE3(105)
34	0CE108ZH6I0	CAPACITOR,FIXED ELECTROLYTIC	LU 25V-1000UF M (13*20) F/C5	G-LUXON(MTI)	CE3(105)
35	0CE687ZH6I0	CAPACITOR,FIXED ELECTROLYTIC	680UF YXG 25V 20% FL BULK	RUBYCON,SAMWHA	CE3(105)
35	0CE108ZH6I0	CAPACITOR,FIXED ELECTROLYTIC	LU 25V-680UF M (13*20) F/C5	G-LUXON(MTI)	CE3(105)
36	0CE108ZJ6I0	CAPACITOR,FIXED ELECTROLYTIC	1000UF YXG 35V 20% FL BULK	RUBYCON,SAMWHA	CE4(105)
36	0CE108ZJ6I0	CAPACITOR,FIXED ELECTROLYTIC	LU 35V-1000UF M (13*25) F/C5	G-LUXON(MTI)	CE4(105)
37	0CE227ZF638	CAPACITOR,FIXED ELECTROLYTIC	220UF YK 16V 20% FM5 TP 5	RUBYCON,SAMWHA	CE5(85)
37	0CE227ZF638	CAPACITOR,FIXED ELECTROLYTIC	GR 16V-220UF M (8*11) T/P5	G-LUXON(MTI)	CE5(85)
38	0CE227XH638	CAPACITOR,FIXED ELECTROLYTIC	220UF RD 25V 20% FM5 TP 5	RUBYCON,SAMWHA	CE7,8(105)
38	0CE227XH638	CAPACITOR,FIXED ELECTROLYTIC	SM 25V-220UF M (8*11) T/P5	G-LUXON(MTI)	CE7,8(105)
39	0CE106ZK638	CAPACITOR,FIXED ELECTROLYTIC	10UF YK 50V 20% FM5 TP 5	RUBYCON,SAMWHA	CE6,9,10,12,13(85)
39	0CE106ZK638	CAPACITOR,FIXED ELECTROLYTIC	GR 50V-10UF M (5*11) T/P5	G-LUXON(MTI)	CE6,9,10,12,13(85)
40	0CE105ZK638	CAPACITOR,FIXED ELECTROLYTIC	1UF YK 50V 20% FM5 TP 5	RUBYCON,SAMWHA	CE11(85)
40	0CE105ZK638	CAPACITOR,FIXED ELECTROLYTIC	GR 50V-1UF M (5*11) T/P5	G-LUXON(MTI)	CE11(85)
41	0CF334086570	CAPACITOR,FIXED FILM	330NF 0 275V 20% BULK M/PP NI	PILKOR	CM1
41	0CF334086570	CAPACITOR,FIXED FILM	MPX 275V-0.33UF M F/C22.5	EUROPTRONIC(MTI)	CM1
42	0CF224086570	CAPACITOR,FIXED FILM	220NF 0 275V 20% BULK M/PP NI	PILKOR	CM2
42	0CF224086570	CAPACITOR,FIXED FILM	MPX 275V-0.22UF M F/C22.5	EUROPTRONIC(MTI)	CM2
43	0C04732Y430	CAPACITOR,FIXED FILM	47000PF S 630V J M/PE NI R	SEIL	CM3
43	0C04732Y430	CAPACITOR,FIXED FILM	DMPE 630V-0.047UF K F/C17.5	EUROPTRONIC(MTI)	CM3
44	0CK221025I0	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	220P 2KV K B S	SAM WHA,DOOSAN	CC2
44	0CK221025I0	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	DCH 2KV-220PF K Y5P(B) F/C10	HONGMING(MTI)	CC2
45	0CK224DK94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	220NF 2012 50V 80%,-20% F(Y5V) R/TP	MURATA	CC3
46	0CK104DK94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	100NF 2012 50V 80%,-20% R/TP F(Y5V)	MURATA	CC4-9
47	0CK223DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC10-13,15,17,19-21
48	0CK223DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC14
49	0RH0000L622	RESISTOR,METAL GLAZED(CHIP)	0 OHM 1/8 W 5% 2012 R/TP	ROHM	CC14(R)
50	0CK102DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	1NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC16,18
51	0CK471DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	0.00047UF 2012 50V 80%,-20% R/TP X7R	MURATA	CC1
51	0RW3303J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	330K OHM 1 W 5% TA52	SMART,CHOHYANG	R1
52	0RD5603H609	RESISTOR,FIXED CARBON FILM	560K OHM 1/2 W 5% TA52	SMART,CHOHYANG	R2
53	0R5562X641	RESISTOR,FIXED METAL OXIDE FILM	56K OHM 2 W 5.00% F20	SMART,CHOHYANG	R3
54	0RD680IG609	RESISTOR,FIXED CARBON FILM	6.8K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R4
55	0RD1200G609	RESISTOR,FIXED CARBON FILM	120 OHM 1/4 W 5% TA52	SMART,CHOHYANG	R5
56	0RD6800G609	RESISTOR,FIXED CARBON FILM	680 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R6
57	0RW010IJ609	RESISTOR,FIXED POWER COATED WIRE-WOUND	1 OHM 1 W 5% TA52	SMART,CHOHYANG	ROCP
58	0RW0560J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	0.56 OHM 1 W 5% TA52	SMART,CHOHYANG	ROCP
59	0RD1801G609	RESISTOR,FIXED CARBON FILM	1.8K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R8
60	0RH100IL622	RESISTOR,METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R9

EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
61	0RH1004L622	RESISTOR,METAL GLAZED(CHIP)	1MOHM 1/8 W 5% 2012 R/TP	ROHM	R10
62	0RH470IL622	RESISTOR,METAL GLAZED(CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	-
63	0RH1002L622	RESISTOR,METAL GLAZED(CHIP)	10KOHM 1/8 W 5% 2012 R/TP	ROHM	R14-19,33,40,51
64	0RH200IL622	RESISTOR,METAL GLAZED(CHIP)	2K OHM 1 / 8 W 5% 2012 R/TP	ROHM	R23
65	0RD470IG609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R11,20,21,24,25,31,37,38,44
66	0RD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R12,49,50
67	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R)J1
67	0RD100IG609	RESISTOR,FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J1
67	0RD180IG609	RESISTOR,FIXED CARBON FILM	1.8K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J1
68	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R)J2
68	0RD120IG609	RESISTOR,FIXED CARBON FILM	1.2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J2
68	0RD240IG609	RESISTOR,FIXED CARBON FILM	2.4K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J2
69	0RD1202G609	RESISTOR,FIXED CARBON FILM	12K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
69	0RD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
69	0RD820IG609	RESISTOR,FIXED CARBON FILM	8.2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
70	0RD200IG609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R25,27,28,36,43,45-48
71	0RD200IG609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R29,30
72	0RD100IG609	RESISTOR,FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R22
73	0RD390IG609	RESISTOR,FIXED CARBON FILM	3.9K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R32,39
74	0RD150IH609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/2 W 5.00% TA52	SMART,CHOHYANG	R35,42
75	0RN1622G409	RESISTOR,FIXED METAL FILM	16.2K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF1
76	0RN2612G409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RD1,RR1,RR2
77	0RN910IG409	RESISTOR,FIXED METAL FILM	9.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF2
78	0RN240IG409	RESISTOR,FIXED METAL FILM	2.4K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF3
79	0RN1002G409	RESISTOR,FIXED METAL FILM	10K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RT1
80	0RD3300G609	RESISTOR,FIXED CARBON FILM	330 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R34,41
81	0TRKE00008A	TRANSISTOR,BIPOLARS	KEC KTB1151 BK TO126 60V 5A	KEC	Q2,4
82	0TR319809AA	TRANSISTOR	KTC3198-TP-Y (KTC1815)KEC	KEC	Q3,5
83	0TRI06009AF	TRANSISTOR,BIPOLARS	KRC106M KEC TP TO92M 50V 100MA	KEC	Q1
84	6210JB800IA	FILTER(CIRC),EMC	BFS351OA0 SAMWHA 52 -	SAW WHA	FB1
85	0FS500IB502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LD/GL UL / CSA	SAW JU	FUSE2
86	6600RRT00W	SWITCH,TACT	THVV502GAA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
87	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	J03-21,23-40
88	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JCR1-JCR4
89	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	OP1
90	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JF1,JF2
91	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP1
92	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP2
93	6200JB8009B	FILTER(CIRC),EMC	CH940050 TNC BK -	TNC	L1
94	6200JB8007X	FILTER(CIRC),EMC	UYII-05320 TNC BK 0.5A 320MH	TNC	L2
95	0LR100IW4F0	INDUCTOR,RADIAL LEAD	1000UH 20% R 6X12.5 BULK	TNC	L3,4
96	3J02447C	FUSE,DRAWING	15A 250V - EF	SAW JU	FUSE1
97	6901JB800IA	FUSE ASSEMBLY	KORE-PJT N/S	SAW JU	FUSE HOLDER
98	0001030F	CONNECTOR (CIRC),WAFER	GP881191-2 HAN KUK DAN JA NA NA NA	KET	TAB1,2
99	4920JB3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-S64,65,73 2PIN 1-SCREW 3MM	TAE SUNG	(IC2)
100	1SBF0302418	SCREW TAP TITE(S),BINDING HEAD	+ D3.0 L8.0 MSWR3/FZY	TAE SUNG	(IC2)
101	9WWF0120000	SOLDER(ROSIN WIRE) RSO	D1.20	-	(IC2)
102	49111004	SOLDER,SOLDERING	NA HEESUNG METAL BAR SN 63% NA	HISUNG	-
103	59333105	FLUX	SG;0.825-0.830 KOREA F.H-206	KOKI	-
104	0DZRM00188A	DIODE,ZENERS	RLZ ROHM R/TP LLDS(LL-34) 500MW 5.6V 20MA .PF	ROHM	ZD1
	((MAGIC-ROOM))				
105	6630JB8007N	CONNECTOR (CIRC),WAFER	1746062-1 AMP 14P 2.5MM	AMP	CON7
106	0IT0777400A	IC,DRAWING	TA7774AP 16,SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC9
107	0CE1056K638	CAPACITOR,FIXED ELECTROLYTIC	1UF SM5,5G 50V 20% FM5 TP 5	RUBYCON	CE14(85)
	0CE1052K638	CAPACITOR,FIXED ELECTROLYTIC	GR 50V-1UF M (5*11) T/P5	G-LUXON(MTI)	CE14(85)
108	0CE1054K638	CAPACITOR,FIXED ELECTROLYTIC	10UF KM TYPE 50V 20% FM5 TP 5	RUBYCON	CE15(85)
	0CE1062K638	CAPACITOR,FIXED ELECTROLYTIC	GR 50V-10UF M (5*11) T/P5	G-LUXON(MTI)	CE15(85)
109	0CK223DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC22,23
110	0RH1002L622	RESISTOR,METAL GLAZED(CHIP)	10KOHM 1/8 W 5% 2012 R/TP	ROHM	R54
111	0RH0000L622	RESISTOR,METAL GLAZED(CHIP)	0 OHM 1/8 W 5% 2012 R/TP	ROHM	R13
112	0RD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R52,53
113	0RD470IG609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R55
114	0RD200IG609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R56
115	0RN2612G409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RR3
116	0TRI06009AC	TRANSISTOR,BIPOLARS	KRA106M (KRA2206) KEC TP TO92M 50V 100MA	KEC	Q6-8
117	0TRI06009AC	TRANSISTOR,BIPOLARS	KRA106M (KRA2206) KEC TP TO92M 50V 100MA	KEC	Q9

EXPLATION FOR MICOM CIRCUIT

<GW-B/C227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	6870JB8190A	PWB(PCB)	05LED BASIC KS VER-1	DOO SAN	T=1.6
2	6170JB2012A	TRANSFORMER,SMPS(COIL)	DL-PJT 2.9MH/20W	SAM IL	TRANS
2	6170JB2012C	TRANSFORMER,SMPS(COIL)	GR-B217/257*A(G) BLDC 110-127V	SAM IL	TRANS
3	6630VM02707	CONNECTOR (CIRC),WAFER	YW396 YEONHO 7P 3.96MM (7P-2,4,6)	YEON HO	CON2
4	6630VM02609	CONNECTOR (CIRC),WAFER	YW396 YEONHO 9P 3.96MM (9P-2,4,6,8)	YEON HO	CON1
5	6630JB8007K	CONNECTOR (CIRC),WAFER	917789-1 AMP 11P 2.5MM STRAIGHT SN	AMP	CON3
6	6630JB8007L	CONNECTOR (CIRC),WAFER	917790-1 AMP 12P 2.5MM STRAIGHT SN	AMP	CON4
7	6630JB8010A	CONNECTOR (CIRC),WAFER	917791-1 AMP 13P 2.5MM STRAIGHT SN	AMP	CON5
8	0IZZJB2060S	IC,DRAWING	TMP87PM84IN 64P SDIP ST OTP 05LED NDD-PJT BASIC,05MD K/S	TOSHIBA	IC1
8	0IZZJB2058J	IC,DRAWING	TMP87PM84IN 64P SDIP ST OTP 05LED NDD(BASIC),VIKING(DLX) GPOR	TOSHIBA	IC1
8	0IZZJB2058V	IC,DRAWING	TMP87PM84IN 64P SDIP ST OTP 05LED NDD(BASIC),VIKING(DLX) IBCMDEFN	TOSHIBA	IC1
9	0IPMGSK001A	IC,POWER MANAGEMENT	STR-G635IL SANKEN 5PIN TO220 ST SMPS I CHIP	SANKEN	IC2
10	0IPMGNE001A	IC,POWER MANAGEMENT	PS2561-1 NEC 4P,DIP BK = TLP762JF	NEC	IC3
11	0IKE431000A	IC,KEC	KIA431 3 PIN TP - -	KEC	IC4
12	0IKE780500Z	IC,LINEAR	KIA7805PI - - - -	KEC	IC5
13	0IKE650030C	IC,KEC	KID65003AF 16SOP BK 7CH DRIVER	KEC	IC6
14	0IKE704200A	IC,KEC	KIA7042P KEC 3P BK RESET	KEC	IC9
15	0IT0777400A	IC,DRAWING	TA7774AP 16,SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC10
16	0IRH934600D	IC,ROHM	BR93LC46RF-W 8PIN SOP BK EEPROM	ROHM	IC12
17	0ISTLMI001A	IC,STANDARD LOGIC	M54563FP MITSUBISHI 20 P/TP CONVERT	MISUBISHI	IC13
18	0IKE650030C	IC,KEC	KID65003AF 16SOP BK 7CH DRIVER	KEC	IC14
19	6920000001A	RELAY	ALE15BI2 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MASUSHITA	RY1,4
	6920JB2005B	RELAY	G5JS-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING	OMRON	
	6920JB2005C	RELAY	DHIU 11 DEC 250VAC 16A 12VDC 1A VENTING	DAIICHI	
20	6920JB2004D	RELAY	DH12DI-0-Q (JAPAN) DEC 250VAC 10A 12VDC 1A NO VENTING	DAIICHI	RY2
21	6920000001A	RELAY	ALE15BI2 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MASUSHITA	RY2(EXPORT)
	6920JB2005B	RELAY	G5JS-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING	OMRON	
	6920JB2005C	RELAY	DHIU 11 DEC 250VAC 16A 12VDC 1A VENTING	DAIICHI	
21	6920JB2003E	RELAY	G5NB-1A-E(CHINA) OMRON 250VAC 5A 12VDC 1A NO VENTING	OMRON	
22	6920ALZ001A	RELAY	ALZ12BI2 NAIS 250VAC 16A 12VDC 1C NO VENTING	NAIS	RY3
23	6920JB2009B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC 1C NO-VENTING	OMRON	RY5(H/BAR)
24	6920JB2009B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC 1C NO-VENTING	OMRON	RY6
25	6920JB2004D	RELAY	DH12DI-0-Q (JAPAN) DEC 250VAC 10A 12VDC 1A NO VENTING	DAIICHI	RY7
26	6920000001A	RELAY	ALE15BI2 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING	MASUSHITA	RY7(EXPORT)
	6920JB2005B	RELAY	G5JS-1A-NT OMRON 250VAC 16A 12VDC 1A NO VENTING	OMRON	
	6920JB2005C	RELAY	DHIU 11 DEC 250VAC 16A 12VDC 1A VENTING	DAIICHI	
26	6920JB2003E	RELAY	G5NB-1A-E(CHINA) OMRON 250VAC 5A 12VDC 1A NO VENTING	OMRON	
27	6212BA304IA	RESONATOR,CERAMIC	CSTLS4M000G53-A0 MURATA 4.00MHZ +/- 0.5% TA 15PF	MURATA	OSC1
28	6102JB8001A	VARISTOR	SVC621D-14A SAMWHA UL/VDE BK 620V	SAW WHA,IL JIN	VA1
29	6102JB8001E	VARISTOR	SVC271D-14A SAMWHA UL/VDE BK 270V	SAW WHA,IL JIN	VA1
30	0DRI07009AA	DIODE,RECTIFIERS	FRI07 TP DELTA D041 1000V 1A 3	DELTA	DI,2,12,13,14,15
31	0DRSA00090A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D3
32	0DRSA00090A	DIODE,RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D4
33	0DB360000AA	DIODE,RECTIFIERS	D3SBA60 BK SHINDENGEN 600V 4A	SHINDENGEN	BD1
34	0DD400409AA	DIODE,RECTIFIERS	IN4004 PYUNG CHANG TP26 D041 400V 1A 30A 75NS 5UA	DELTA,PYUNGCHANG	D5-8
35	0CE476ZV6E0	CAPACITOR,FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN	RUBYCON,SAMWHA	CE1(105)
36	0CE686ZU6E0	CAPACITOR,FIXED ELECTROLYTIC	68UF MXC 400V 20% BULK SNAP IN	RUBYCON,SAMWHA	CE1(105)
37	0CE226ZK63B	CAPACITOR,FIXED ELECTROLYTIC	22UF YXA 50V 20% FM5 TP 5	RUBYCON,SAMWHA	CE2(105)
38	0CE108ZH610	CAPACITOR,FIXED ELECTROLYTIC	1000UF YXG 25V 20% FL BULK	RUBYCON,SAMWHA	CE3(105)
39	0CE108ZJ610	CAPACITOR,FIXED ELECTROLYTIC	1000UF YXG 35V 20% FL BULK	RUBYCON,SAMWHA	CE4(105)
40	0CE227ZF63B	CAPACITOR,FIXED ELECTROLYTIC	220UF YK 16V 20% FM5 TP 5	RUBYCON,SAMWHA	CE5(85)
41	0CE227XH63B	CAPACITOR,FIXED ELECTROLYTIC	220UF RD 25V 20% FM5 TP 5	RUBYCON,SAMWHA	CE9,10(105)
42	0CE105ZK63B	CAPACITOR,FIXED ELECTROLYTIC	1UF YK 50V 20% FM5 TP 5	RUBYCON,SAMWHA	CE13(85)
43	0CE106ZK63B	CAPACITOR,FIXED ELECTROLYTIC	10UF YK 50V 20% FM5 TP 5	RUBYCON,SAMWHA	CE6-8,11,12
44	0CE476HH63B	CAPACITOR,FIXED ELECTROLYTIC	47UF SMS,SG 25V 20% FM5 TP 5	RUBYCON,SAMWHA	CE14
45	0CK471DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	0.00047UF 2012 50V 80%,-20% R/TP X7R	MURATA	CC1
46	0CK221025I0	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	220P 2KV K B S	SAW WHA, DOOSAN	CC2
47	0CK224DK94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	220NF 2012 50V 80%,-20% F(Y5V) R/TP	MURATA	CC3
48	0CK104DK94A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	100NF 2012 50V 80%,-20% R/TP F(Y5V)	MURATA	CC4-6,8,9,7
49	0CK223DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC10,12-16,18,20-22
50	0CK102DK96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRIC)	1NF 2012 50V 80%,-20% R/TP X7R	MURATA	CC17,19,11
51	0CQ224I8670	CAPACITOR,FIXED FILM	0.22UF D 275V 20% M/PP NI R	PILKOR	CM2
52	0CF334086?0	CAPACITOR,FIXED FILM	330NF 0 275V 20% BULK M/PP NI	PILKOR	CM1
53	0CQ4732Y430	CAPACITOR,FIXED FILM	47000PF S 630V J M/PE NI R	SEIL	CM3
54	0RW3303J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	330K OHM 1 W 5% TA52	SMART,CHOHYANG	R1
55	0RD5603H609	RESISTOR,FIXED CARBON FILM	560K OHM 1/2 W 5% TA52	SMART,CHOHYANG	R2
56	0RS5602K641	RESISTOR,FIXED METAL OXIDE FILM	56K OHM 2 W 5.00% F20	SMART,CHOHYANG	R3
57	0RD680IG609	RESISTOR,FIXED CARBON FILM	6.8K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R4
58	0RD1200G609	RESISTOR,FIXED CARBON FILM	120 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R5
59	0RD1000G609	RESISTOR,FIXED CARBON FILM	100 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R5
60	0RD680DG609	RESISTOR,FIXED CARBON FILM	680 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R6

EXPLATION FOR MICOM CIRCUIT

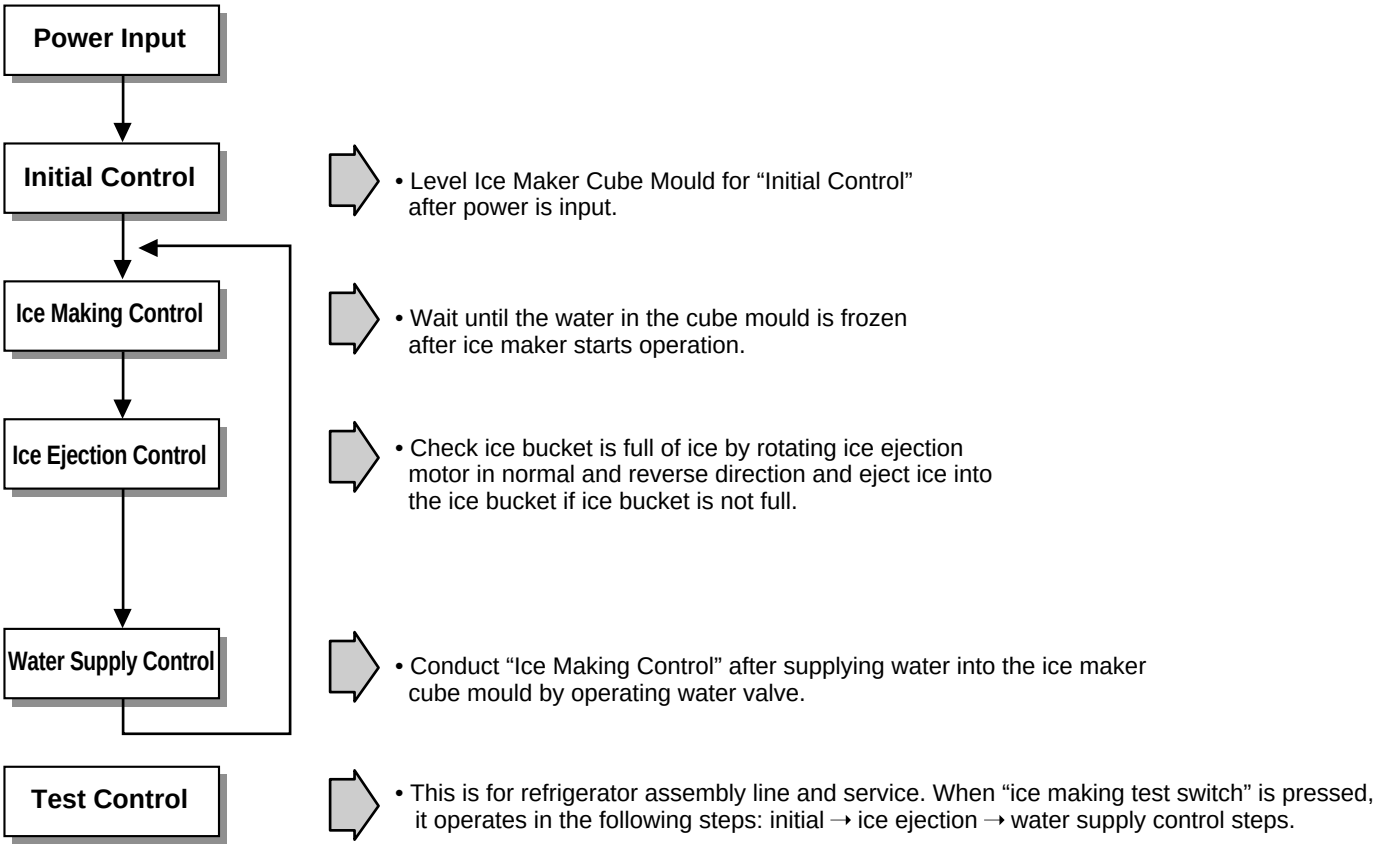
<GW-B/C227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
61	ORW0101J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	1 OHM 1 W 5% TA52 (NON-INDUCTIVE)	SMART,CHOHYANG	ROCP
62	ORW0560J609	RESISTOR,FIXED POWER COATED WIRE-WOUND	0.56 OHM 1 W 5% TA52 (NON-INDUCTIVE)	SMART,CHOHYANG	ROCP
63	ORD1801G609	RESISTOR,FIXED CARBON FILM	1.8K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R8
64	ORD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R10,51,52,53
65	ORD4701G609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R12,33,39,40,46
66	ORD3600H609	RESISTOR,FIXED CARBON FILM	360 OHM 1/2 W 5% TA52	SMART,CHOHYANG	R23,24,55
67	ORD1001G609	RESISTOR,FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R9,17
68	ORH1000L622	RESISTOR,METAL GLAZED(CHIP)	100 OHM 1 / 8 W 5% 2012 R/TP	ROMH	R27
69	ORH2200L622	RESISTOR,METAL GLAZED(CHIP)	220 OHM 1/8 W 5% 2012 R/TP	ROMH	R19
70	ORH1001L622	RESISTOR,METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROMH	R18
71	ORH1004L622	RESISTOR,METAL GLAZED(CHIP)	1M OHM 1/8 W 5% 2012 R/TP	ROHM	R11
72	ORH1002L622	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 5% 2012 R/TP	ROHM	R35,42
73	ORH4701L622	RESISTOR,METAL GLAZED(CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	R13-16,20,21,22,54,56
74	ORH2001L622	RESISTOR,METAL GLAZED(CHIP)	2K OHM 1 / 8 W 5% 2012 R/TP	ROHM	R25,26
75	ORH3300L622	RESISTOR,METAL GLAZED(CHIP)	330 OHM 1/8 W 5% 2012 R/TP	ROHM	R43,36
76	ORN1002G409	RESISTOR,FIXED METAL FILM	10K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RT1
77	ORD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
78	ORD1202G609	RESISTOR,FIXED CARBON FILM	12K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
79	ORD8201G609	RESISTOR,FIXED CARBON FILM	8.2K OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	RCR1
80	ORD3901G609	RESISTOR,FIXED CARBON FILM	3.9K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R34,41
81	ORD1501H609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/2 W 5% TA52	SMART,CHOHYANG	R37,44
82	ORD2001G609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R28-32,38,45,47-50
83	ORN1622G409	RESISTOR,FIXED METAL FILM	16.2K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF1
84	ORN2612G409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RD1,RR1,RR2
85	ORN9101G409	RESISTOR,FIXED METAL FILM	9.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF2
86	ORN2401G409	RESISTOR,FIXED METAL FILM	2.4K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF3
87	ORD1201G609	RESISTOR,FIXED CARBON FILM	1.2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J1
88	ORD1201G609	RESISTOR,FIXED CARBON FILM	1.2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J2
89	OTRKE00008A	TRANSISTOR,BIPOLARS	KEC KTB1151 BK TO126 60V 5A	KEC	Q2,4
90	OTR3198-09AA	TRANSISTOR	KTC3198-TP-Y (KTC1815)KEC	KEC	Q3,5
91	OTR106009AC	TRANSISTOR	KRA 106M(KRA2206) KEC TP TO92M 50V 100MA	KEC	Q6
92	OTR106009AF	TRANSISTOR	KRC 106M KEC TP TO92M 50V 100MA	KEC	Q7
93	6210JB8001A	FILTER(CIRC),EMC	BFS3510A0 SAMWHA 52 -	SAW WHA	FB1
94	6600RRT001W	SWITCH,TACT	THVV502GAA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
95	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	J01-25
96	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP1
97	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP2
98	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	OP1
99	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R)J1
100	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R)J2
101	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JF1,JF2
102	6908JB3002A	BUZZER	BM-20K BUJEON PIEZO 2KHZ 80DB	BUJEON	BUZZER
103	6200JB8009B	FILTER(CIRC),EMC	CHB40050 TNC BK -	TNC	L1
104	6200JB8007X	FILTER(CIRC),EMC	UV11-05320 TNC BK 0.5A 320MH	TNC	L2
105	OLR1001M4F0	INDUCTOR,RADIAL LEAD	1000UH 20% R 6X12.5 BULK	TNC	L3,4
106	3J02447C	FUSE,DRAWING	15A 250V - EF	SAM JU	FUSE1
107	6901JB8001A	FUSE ASSEMBLY	KORE-PJT N/S	SAM JU	FUSE HOLDER
108	OFS5001B502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LD/GL UL / CSA	SAM JU	FUSE2
109	0001030F	CONNECTOR (CIRC),WAFER	GP881191-2 HAN KUK DAN JA NA NA NA	KET	TAB1,2
110	4920JB3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-S64,65,73 2PIN 1-SCREW 3MM	TAE SUNG	(IC2)
111	1SBF0302418	SCREW TAP TITE(S),BINDING HEAD	+ D3.0 L8.0 MSWR3/FZY	-	(IC2)
112	9VWF0120000	SOLDER(ROSIN WIRE) RS0	D1.20	-	-
113	49111004	SOLDER,SOLDERING	NA HEESUNG METAL BAR SN 63% NA	HEE SUNG	-
114	59333105	FLUX	SG;0.825-0.830 KOREA F.H-206	KOKI	-
115					
116					

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

1. Working Principles

1-1. Ice Maker Working Principles


Power Input
Initial Control
• Level Ice Maker Cube Mould for “Initial Control” after power is input.
Ice Making Control
• Wait until the water in the cube mould is frozen after ice maker starts operation.
Ice Ejection Control
• Check ice bucket is full of ice by rotating ice ejection motor in normal and reverse direction and eject ice into the ice bucket if ice bucket is not full.
Water Supply Control
• Conduct “Ice Making Control” after supplying water into the ice maker cube mould by operating water valve.
Test Control
• This is for refrigerator assembly line and service. When “ice making test switch” is pressed, it operates in the following steps: initial → ice ejection → water supply control steps.

1-2. Dispenser Working Principles

1. This function is available in Model GW-P227, GW-L227 where water and ice are available without opening freezer compartment door.
2. “Crushed Ice” is automatically selected when power is initially applied or reapplied after power cut.
3. When dispenser selection switch is continuously pressed, light is on in the following sequence: “Water” → “Cube Ice” → “Crushed Ice” .
4. Lamp is on when dispenser button is pressed.
5. In case of crushed ice mode, when dispenser button is pressed, dispenser solenoid and geared motor work so that crushed ice can be dispensed if there is ice in the ice bank.
6. In case of cubed ice mode, when dispenser button is pressed, cube ice solenoid and geared motor work so that cube ice can be dispensed if there is ice in the ice bank.
7. In case of water mode, when dispenser button is pressed, water valve opens and water is supplied if water valve is normally installed on the right side of the machine room.
8. Ice and water are not available when freezer door is open.

2. Function of Ice Maker

2-1. Initial Control Function

1. When power is initially applied or reapplied after power cut, it detects level of ice maker cube mould after completion of MICOM initialization. The detecting lever moves up and down.
2. The level of ice maker cube mould is judged by output signal, high and low signal, of Hall IC. Make the cube mould to be horizontal by rotating ice ejection motor in normal or reverse direction so that High/Low signal can be applied to MICOM Pin No. 42.(bar LED: Pin NO. 46)
3. If there is no change in signals one minute after the geared motor starts to operate, it stops icemaker operation and check the signal every hour. It resets initialization of icemaker when it becomes normal.
4. It judges that the initial control is completed when it judges the ice maker cube mould is horizontal.
5. Ice ejection conducts for 1 cycle irrespect of ice in the ice bucket when power is initially applied.

2-2. Water Supply Control Function

1. This is to supply water into the ice maker cube mould by operating water valve in the machine room when ice ejection control is completed and ice maker mould is even.
2. The quantity of water supplied is determined by DIP switch and time.

<Water Supply Quantity Table>

No	DIP SWITCH SETTING		WATER SUPPLY TIME	REMARKS
	S1	S2		
1	OFF	OFF	4.5 SEC	* The quantity of water supplied depends on DIP switch setting conditions and water pressure as it is a direct tap water connection type. (the water supplied is generally 60 cc to 100 cc)
2	ON	OFF	4.0 SEC	
3	OFF	ON	5.5 SEC	
4	ON	ON	6.5 SEC	* DIP switch is on the main PCB.

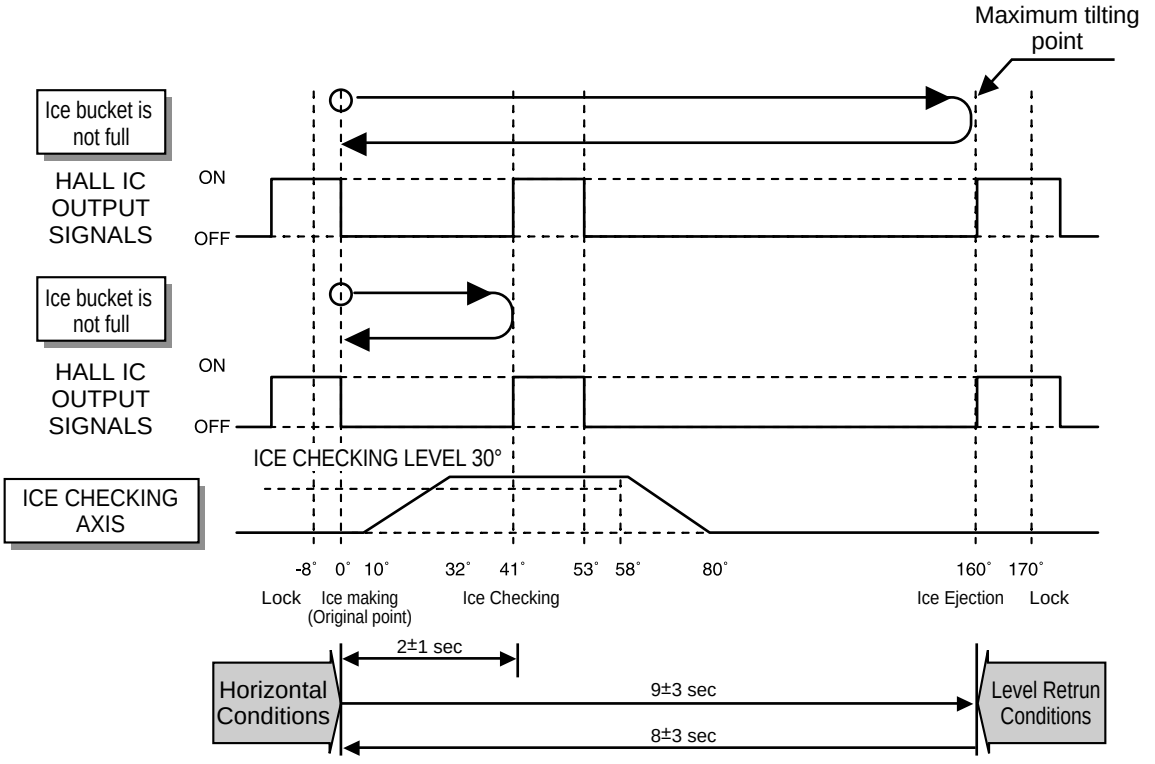
3. If water supply quantity setting is changed while power is on, water supplies for the amended time. If DIP switch is changed during water supply, water shall be supplied for the previous setting time. But it will supply for the amended time from the next supply.
4. When water supply signal is applied to water and ice valves at the same time during water supply, water shall be supplied to water valve. If water supply signal is applied to ice valve during water supply, water shall be supplied to both water and ice valves.

2-3. Ice Making Control Function

1. Ice making control is carried out from the completion of water supply to the completion of ice making in the cube mould. Ice making sensor detects the temperature of cube mould and completes ice making. (ice making sensor is fixed below ice maker cube mould)
2. Ice making control starts after completion of water supply control or initial control.
3. At first, It is judged that ice making is completed when ice making sensor temperature reaches at -8°C after 70 minutes when water is supplied to ice maker cube mould.
4. Finally, It is judged that ice making is completed when ice maker sensor temperature reaches below -12 °C after 20 minutes in condition 3.

2-4. Ice Ejection Control Function

1. This is to eject ice from ice maker cube mould after ice making is completed.
2. If Hall IC signal is on within 3.6 seconds after ice ejection motor rotates in normal direction, it does not proceed ice ejection but waits. If the ice bucket is full, ice ejection motor rotates in normal direction in every hour to check the condition of ice bucket. If the ice bucket is not full, the water supply control starts after completion of ice ejection control. If the ice bucket is full, ice ejection motor rotates in reverse direction and sops under ice making or waiting conditions.
3. If ice bucket is not full, ice ejection starts. The cube mould tilts to the maximum and ice is separated from the mould and ice checking lever raises.
4. Ice ejection motor stops for 1 second if Hall IC signal changes from OFF (low) to ON (high) after 3.6 seconds when ice ejection motor rotates in normal direction. If there is no change in Hall IC signals within 1 minute after ice ejection motor operates, ice ejection motor stops as ice ejection motor or hall IC is out of order.
5. If ice ejection motor or Hall IC is abnormal, ice ejection motor rotates in normal direction to exercise initial operation. It resets the ice maker if ice ejection motor or Hall IC is normal.
6. The mould stops for 1 second at maximum tilted conditions.
7. The mould returns to horizontal conditions as ice ejection motor rotates in reverse direction.
8. When the mould becomes horizontal, the cycle starts to repeat:
   Water Supply → Ice Making → Ice Ejection → Mould Returns to Horizontal



<Timing Chart During Ice Ejection>

2-5 Test Function

1. It is to force the operation during operation test, service, and cleaning. The test switch is mounted under the automatic ice maker. The test function starts when the test switch is pressed for more than 0.5 second.
2. Test button does not work during ice ejection and water supply. It works when it is in the horizontal conditions. If mould is full of ice during test function operation, ice ejection control and water supply control do not work.
3. When test switch is pressed for more than 0.5 second in the horizontal conditions, ice ejection starts irrespect of the mould conditions. Water shall be splashed if test switch is pressed before the water in the mould freezes. Water shall be supplied while the mould returns to the horizontal conditions after ice ejection. Therefore the problems of ice ejection, returning to the horizontal conditions, and water supply can be checked by test switch. When test function performs normally, buzzer sounds and water supply shall carry out. Check it for repair if buzzer does not sound.
4. When water supply is completed, the cycle operates normally as follows: Ice making → Ice ejection → Returning to horizontal conditions → Water supply
5. Remove ice from the ice maker cube mould and press test switch when ice maker cube mould is full of ice as ice ejection and water supply control do not work when cube mould is full of ice.

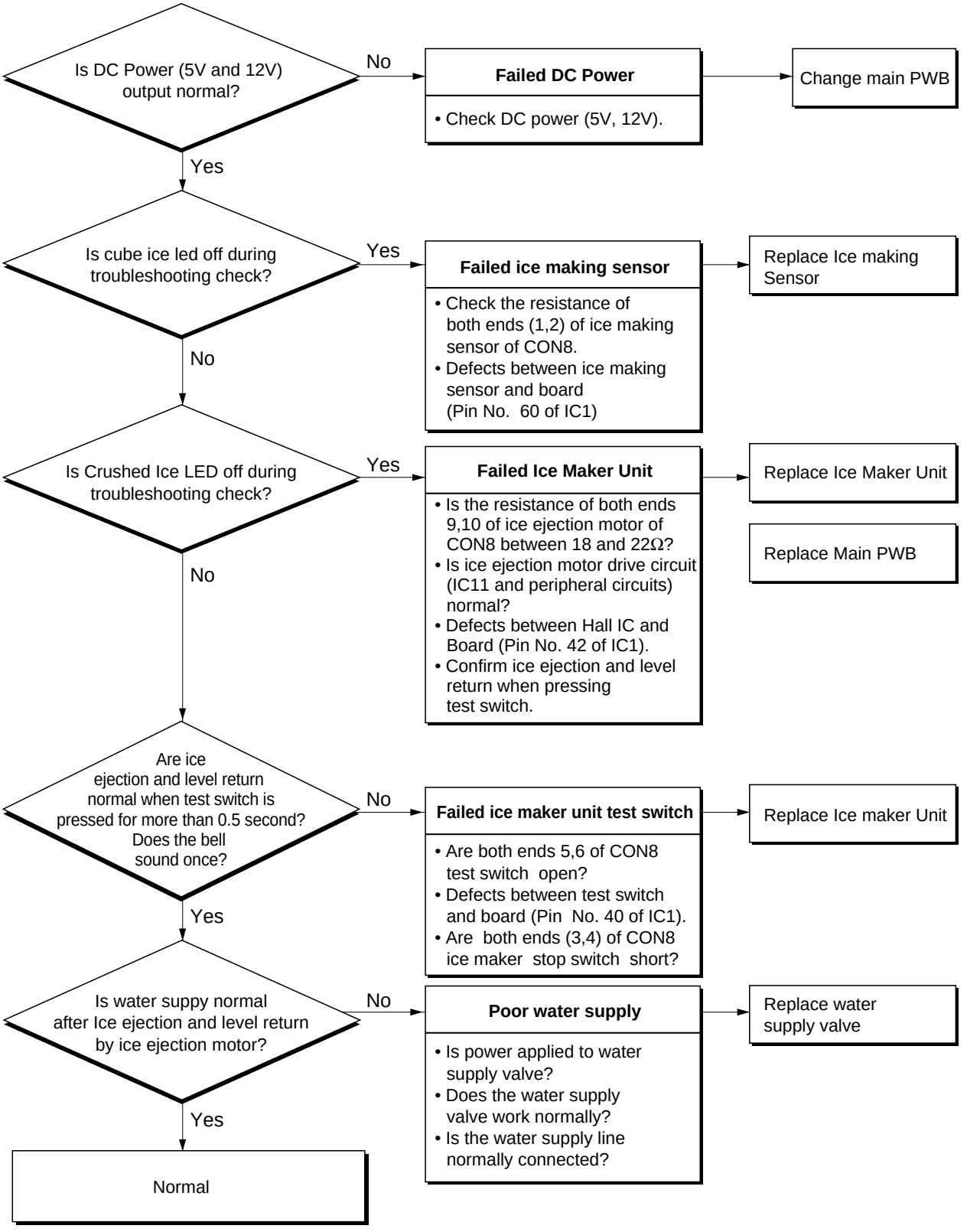
2-6. Other functions relating to freezer compartment door opening

1. When freezer door is open, ice dispenser stops in order to reduce noise and ice drop.
2. When freezer door is open during ice ejection and cube mould returning to horizontal condition, ice ejection and cube mould level return proceed.
3. When freezer door is open, geared motor and cube ice solenoid immediately stop and duct door solenoid stops after 5 seconds.
4. Water dispenser stops in order to protect water drop when freezer door is open.
5. Test function operates normally irrespect of refrigearator compartment door opening.

3. Ice Maker Troubleshooting

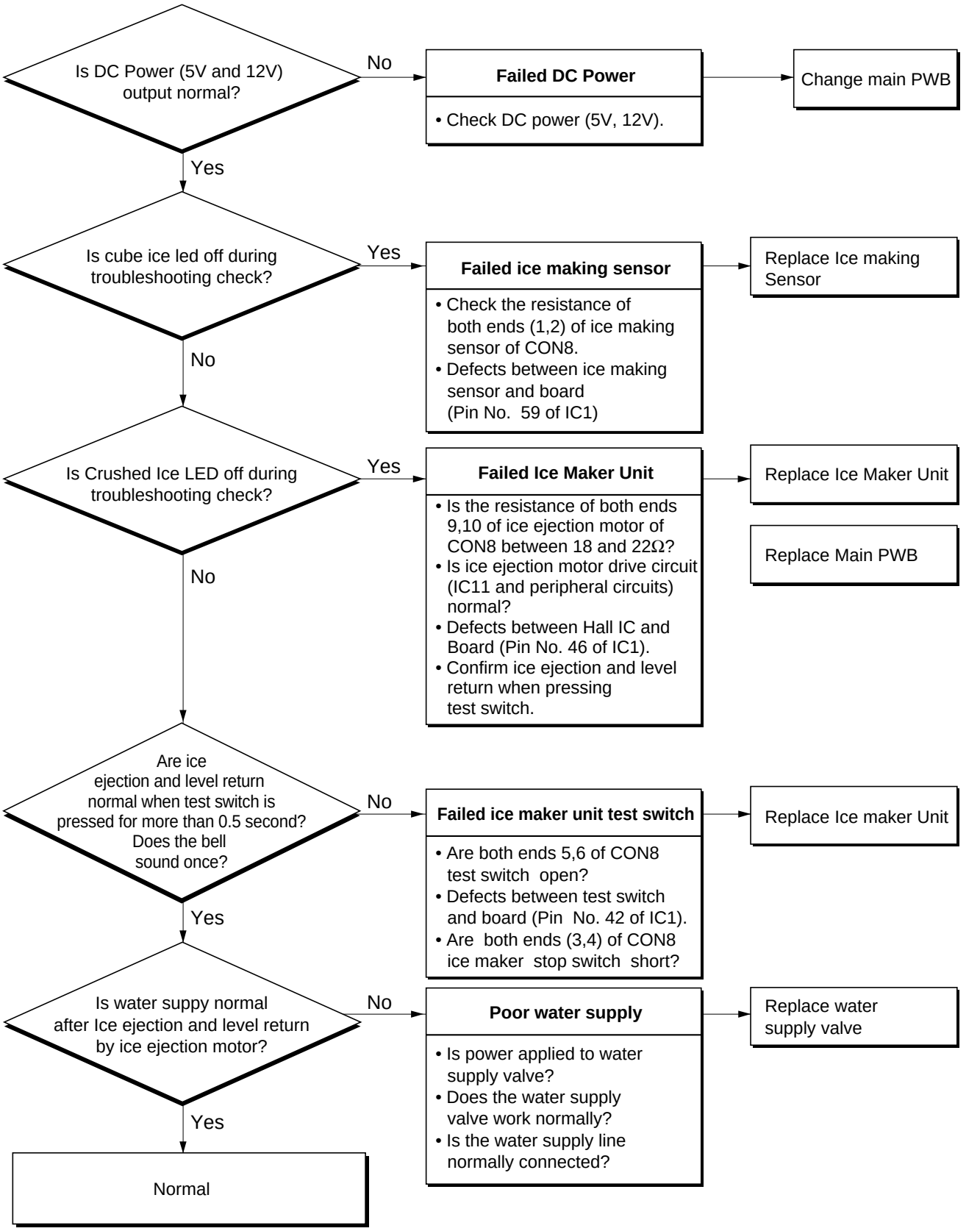
*** Troubleshooting:** it is possible to confirm by pressing freezer and refrigerator temperature control buttons for more than 1 second. (ice maker is normal if all leds are on): refer to trouble diagnposis function in MICOM function 2-8 (page 18)

<GW-P/L227: 88-LED>


Is DC Power (5V and 12V) output normal?
No
Failed DC Power
• Check DC power (5V, 12V).
Change main PWB
Yes
Is cube ice led off during troubleshooting check?
Yes
Failed ice making sensor
• Check the resistance of both ends (1,2) of ice making sensor of CON8.
• Defects between ice making sensor and board (Pin No. 60 of IC1)
Replace Ice making Sensor
No
Is Crushed Ice LED off during troubleshooting check?
Yes
Failed Ice Maker Unit
• Is the resistance of both ends 9,10 of ice ejection motor of CON8 between 18 and 22Ω?
• Is ice ejection motor drive circuit (IC11 and peripheral circuits) normal?
• Defects between Hall IC and Board (Pin No. 42 of IC1).
• Confirm ice ejection and level return when pressing test switch.
Replace Ice Maker Unit
Replace Main PWB
No
Are ice ejection and level return normal when test switch is pressed for more than 0.5 second? Does the bell sound once?
No
Failed ice maker unit test switch
• Are both ends 5,6 of CON8 test switch open?
• Defects between test switch and board (Pin No. 40 of IC1).
• Are both ends (3,4) of CON8 ice maker stop switch short?
Replace Ice maker Unit
Yes
Is water suppy normal after Ice ejection and level return by ice ejection motor?
No
Poor water supply
• Is power applied to water supply valve?
• Does the water supply valve work normally?
• Is the water supply line normally connected?
Replace water supply valve
Yes
Normal

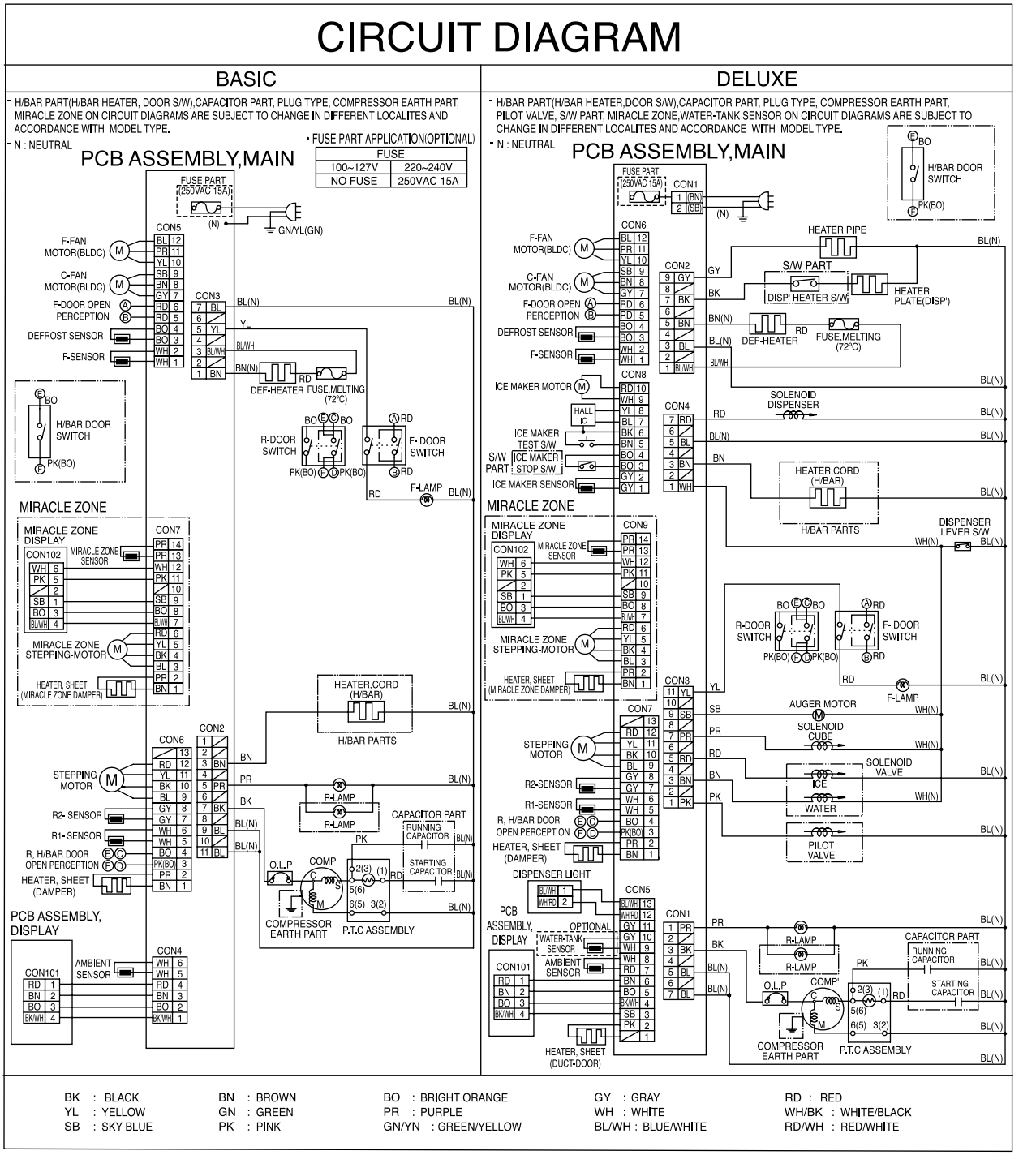
ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

<GW-P/L227: Bar-LED>


Is DC Power (5V and 12V) output normal?
No
Failed DC Power
• Check DC power (5V, 12V).
Change main PWB
Yes
Is cube ice led off during troubleshooting check?
Yes
Failed ice making sensor
• Check the resistance of both ends (1,2) of ice making sensor of CON8.
• Defects between ice making sensor and board (Pin No. 59 of IC1)
Replace Ice making Sensor
No
Is Crushed Ice LED off during troubleshooting check?
Yes
Failed Ice Maker Unit
• Is the resistance of both ends 9,10 of ice ejection motor of CON8 between 18 and 22Ω?
• Is ice ejection motor drive circuit (IC11 and peripheral circuits) normal?
• Defects between Hall IC and Board (Pin No. 46 of IC1).
• Confirm ice ejection and level return when pressing test switch.
Replace Ice Maker Unit
Replace Main PWB
No
Are ice ejection and level return normal when test switch is pressed for more than 0.5 second? Does the bell sound once?
No
Failed ice maker unit test switch
• Are both ends 5,6 of CON8 test switch open?
• Defects between test switch and board (Pin No. 42 of IC1).
• Are both ends (3,4) of CON8 ice maker stop switch short?
Replace Ice maker Unit
Yes
Is water suppy normal after Ice ejection and level return by ice ejection motor?
No
Poor water supply
• Is power applied to water supply valve?
• Does the water supply valve work normally?
• Is the water supply line normally connected?
Replace water supply valve
Yes
Normal

CIRCUIT

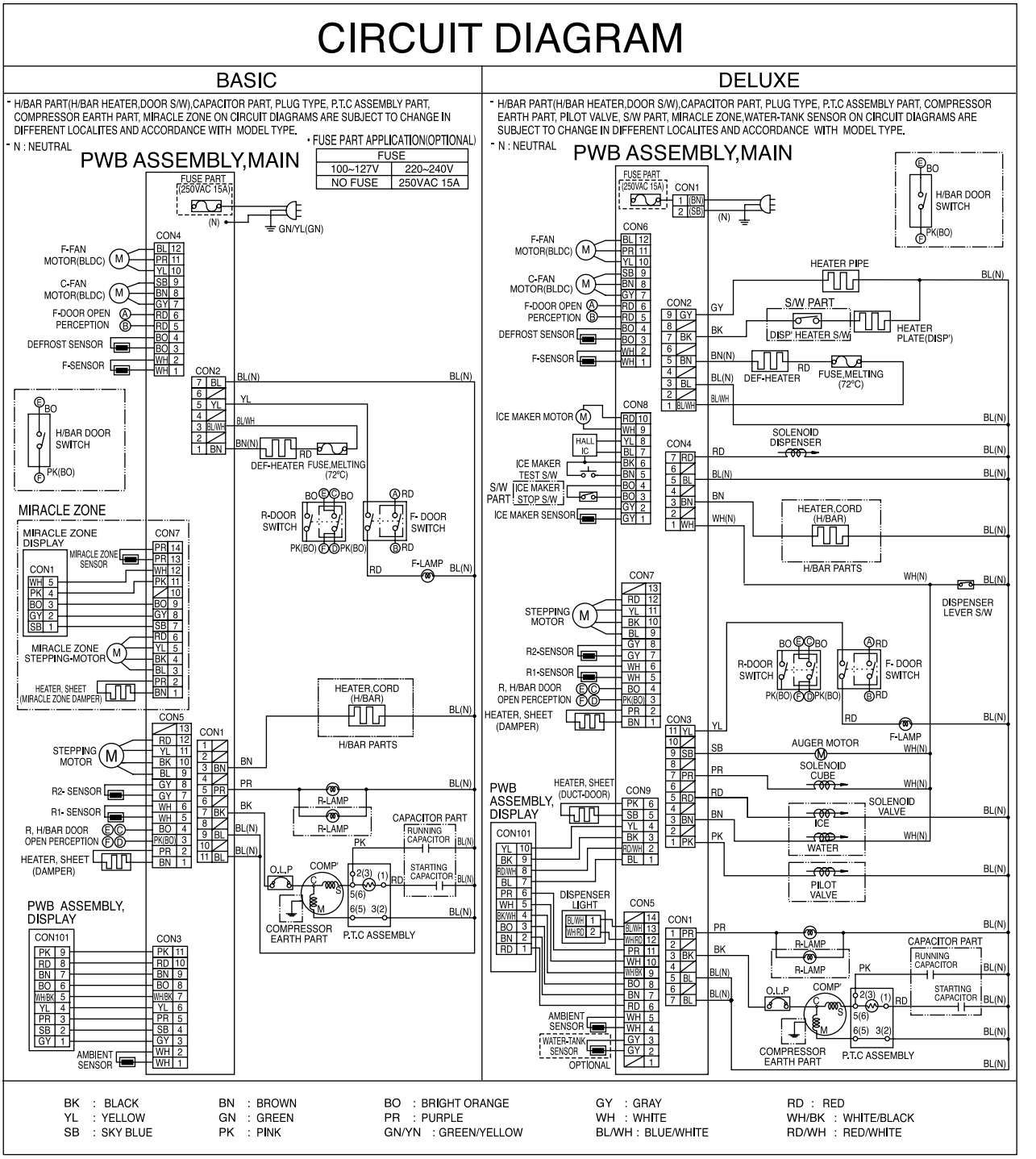
<GW-P/L/B/C227: 88-LED>



CIRCUIT

<GW-P/L/B/C227: Bar-LED>

CIRCUIT DIAGRAM



TROUBLE DIAGNOSIS

1. TROUBLE SHOOTING

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

1. Faulty start	1) No power on outlet.
	2) No power on cord.
	- Bad connection between adapter and outlet. (faulty adapter)
	  - The Inner diameter of adapter.
	  - The distance between holes.
	  - The distance between terminals.
	  - The thickness of terminal.
	- Bad connection between plug and adapter (faulty plug).
	  - The distance between pins.
	  - Pin outer diameter.
	3) Shorted start circuit.
	- No power on power cord.
	  - Disconnected copper wire.
	  - Power cord is disconnected.
	  - Faulty soldering.
	  - Internal electrical short.
	  - Faulty terminal contact.
	  - Loose contact.
	  - Large distance between male terminal.
	  - Thin female terminal.
	  - Terminal disconnected.
	  - Bad sleeve assembly.
	  - Disconnected.
	  - Weak connection.
	  - Short inserted cord length.
	  - Worn out tool blade.
	- O.L.P is off.
	  - Capacity of O.L.P is small.
	  - Characteristics of O.L.P is bad.
	  - Bad connection.
	  - Power is disconnected.
	  - Inner Ni-Cr wire blows out.
	  - Bad internal connection.
	  - Faulty terminal caulking (Cu wire is cut).
	  - Bad soldering.
	- No electric power on compressor. - Faulty compressor.
	- Faulty PTC.
	  - Power does not conduct. - Damage.
	  - Bad characteristics. - Initial resistance is big.
	  - Bad connection with compressor.
	  - Too loose.
	  - Assembly is not possible.
	  - Bad terminal connection.
	4) During defrost.
	- Start automatic defrost.
	- Cycle was set at defrost when the refrigerator was produced.
		* Measuring instrument : Multi tester
		■ Check the voltage. If the voltage is within ±85% of the rated voltage, it is OK.
		■ Check the terminal movement.
		■ Check both terminals of power cord. Power conducts : OK. No power conducts : NG
		■ Check both terminals of O.L.P. If power conducts : OK. If not : NG.
		■ Check the resistance of both terminals. At normal temperature 6 : OK. If disconnected : ∞.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

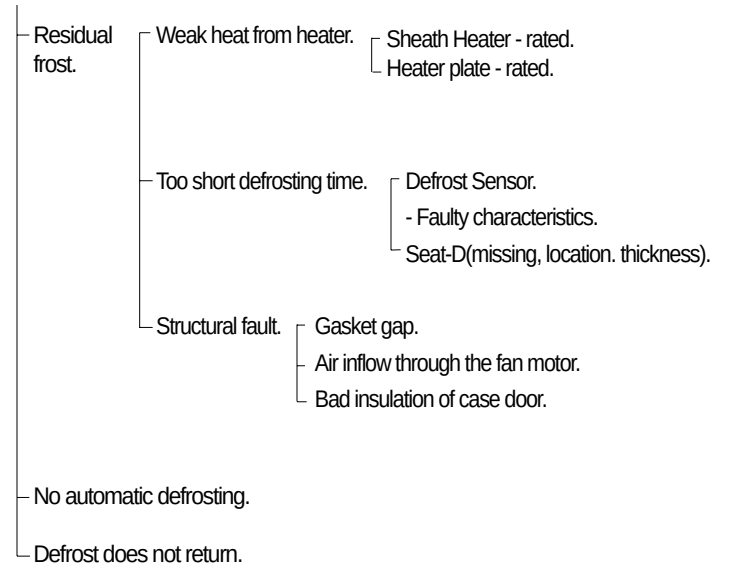
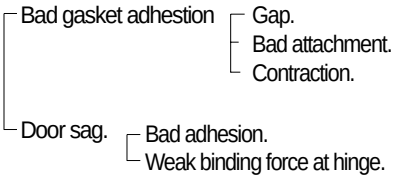
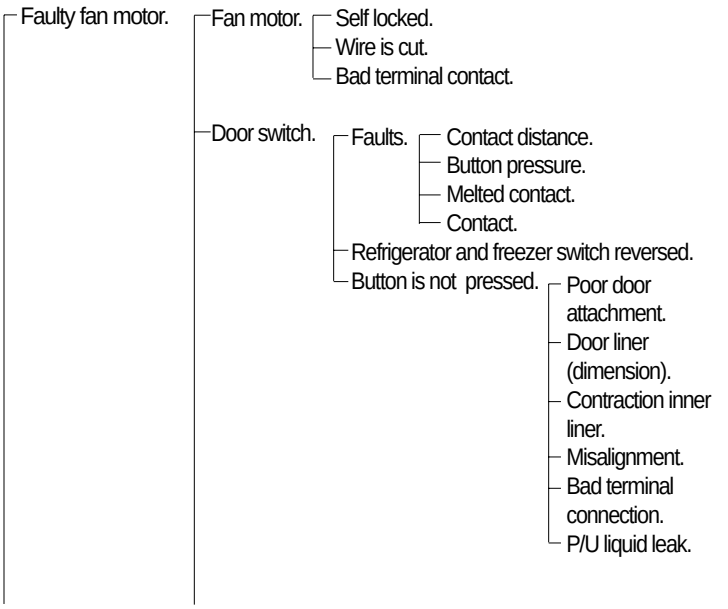
2. No cooling.	2) Refrigeration system is clogged.
	- Moisture clogged.
	  - Residual moisture in the evaporator.
	  - Air Blowing.
	  - Not performed.
	  - Too short.
	  - Impossible moisture confirmation.
	  - Low air pressure.
	  - Leave it in the air.
	  - During rest time.
	  - After work.
	  - Caps are missed.
	  - Residual moisture.
	  - Not dried in the compressor.
	  - Elapsed more than 6 months after drying
	  - Caps are missed.
	  - No pressure when it is open.
	- No electric power on therm-ostat.
	  - Insufficient drier capacity.
	  - Dry drier - Drier temperature.
	  - Leave it in the air.
	  - Check on package condition.
	  - Good storage after finishing.
	  - Residual moisture in pipes.
	  - Caps are missed.
	  - During transportation.
	  - During work.
	  - Air blowing.
	  - Not performed.
	  - Performed.
	  - Too short time.
	  - Low air pressure.
	  - Less dry air.
	  - Moisture penetration into the refrigeration oil. - Leave it in the air. - Moisture penetration.
	- Weld joint clogged.
	  - Short pipe insert.
	  - Pipe gaps.
	  - Too large.
	  - Damaged pipes.
	  - Too much solder.
	- Drier cloggeing.
	  - The capillary tube inserted depth. - Too much.
	  - Capillary tube melts. - Over heat.
	  - Clogged with foreign materials.
	  - Desiccant powder.
	  - Weld oxides.
	  - Drier angle.
	  - Reduced cross section by cutting. - Squeezed.
	- Foreign material clogging.
	  - Compressor cap is disconnected.
	  - Foreign materials are in the pipe.
		■ Check the clogged evaporator by heating (as soon as the cracking sound begins, the evaporator start freezing)
		■ The evaporator does not cool from the beginnig (no evidece of misture attached).
		The evaporator is the same as before even heat is applied.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

3. Refrigeration is weak.	1) Refrigerant Partly leaked.
	- Weld joint leak.
	- Parts leak.
	
	2) Poor defrosting capacity.
	- Drain path (pipe) clogged.
	  - Inject P/U into drain hose.
	  - Inject through the hole.
	  - Seal with drain.
	  - Foreign materials penetration.
	  - P/U lump input.
	  - Screw input.
	  - Other foreign materials input.
	  - Cap drain is not disconnected.
	- Defrost heater does not generate heat.
	  - Parts disconnected.
	  - Heater Sheath
	  - Wire is cut.
	  - Lead wire.
	  - Heating wire.
	  - Contact point between heating and electric wire.
	  - Dent by fine evaporator.
	  - Heating wire is corroded
	  - Water penetration.
	  Bad terminal connection.
		■ Check visually.
		
		■ Check terminal
		Conduction: OK.
		No conduction: NG.
		If wire is not cut, refer to resistance.
		P=Power
		V=Voltage
		R=Resistance
		$P=\frac{V^2}{R}$
		$R=\frac{V^2}{P}$

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
3. Refrigeration is weak.	 3) Cooling air leak.  4) No cooling air circulation. 	■ Check the fan motor conduction: OK. No conduction: NG.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

3. Refrigeration is weak.	4) No cooling air circulation.
	- Faulty fan motor. — Fan is constrained.
	  - Fan shroud contact. - Clearance.
	  - Damping evaporator contact.
	  - Accumulated residual frost.
	- Small cooling air discharge.
	  - Insufficient motor RPM
	  - Fan overload. - Fan misuse.
	  - Bad low termperature RPM characteristics.
	  - Rated power misuse.
	  - Low voltage.
	  - Faulty fan.
	  - Fan misuse.
	  - Bad shape.
	  - Loose connection. - Not tightly connected.
	  - Insert depth.
	  - Shorud. — Bent.
	  - Ice and foreign materials on rotating parts.
	5) Compressor capacity.
	- Rating misuse.
	- Small capacity.
	- Low valtage.
	6) Refrigerant too much or too little.
	- Malfunction of charging cylinder.
	- Wrong setting of refrigerant.
	- Insufficient compressor. - Faulty compressor.
	7) Continuous operation
	- No contact of temperature controller. - Foreign materials.
	8) Damper opens continuously.
	- Foreign materials jammed.
	  - P/U liquid dump.
	  - EPS water sediment.
	  - Screw.
	- Failed sensor. - Position of sensor.
	- Characteristics of damper.
	  - Bad characteristics of its own temperatue.
	  - Parts misuse.
	  - Charge of temperature - Impact. characteristics.
	9) Food storing place. - Near the outlet of cooling air.
		■ Check visually after disassembly.
		■ Check visually after disassembly.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
4. Warm refrigerator compartment temperature.	1) Colgged cooling path. - P/U liquid leak. - Foreign materials. — P/U dump liquid. 2) Food storate. - Store hot food. - Store too much at once. - Door open. - Packages block air flow.	

5. No automatic operation. (faulty contacts.)	1) Faulty temperature sensor in freezer or refrigerator compartment.
	- Faulty contact.
	- Faulty temperature characteristics.
	2) Refrigeration load is too much.
	- Food.
	  - Too much food.
	  - Hot food.
	- Frequent opening and closing.
	- Cool air leak.
	- Poor door close. – Partly opens.
	3) Poor insulation.
	4) Bad radiation.
	- High ambient temperature.
	- Space is secluded.
	
	5) Refrigerant leak.
	6) Inadequate of refrigerant.
	7) Weak compressor discharging power.
	- Different rating.
	- Small capacity.
	8) Fan does not work.
	9) Button is positioned at "strong."
		■ Inspect parts measurements and check visually.

6. Dew and ice formation.	1) Ice in freeezer compartment.
	- External air inflow. — Rubber motor assembly direction(reverse).
	- Door opens but not closes.
	  - Weak door closing power.
	  - Stopper malfunction.
	  - Door sag.
	  - Food hinders door closing.
	- Gap around gasket. — Contraction, distortion, loose, door twisted, corner not fully inserted.
	- Food vapor. — Storing hot food. — Unsealed food.
	2) Condensation in the refrigerator compartment.
	- Door opens but not closes.
	  - Insufficient closing.
	  - Door sag.
	  - Food hinders door closing.
	- Gasket gap.
	3) Condensation on liner foam.
	- Cool air leak and transmitted.
	  - Not fully filled.
	  - Toop table part.
	  - Out plate R/L part.
	  - Flange gap. — Not sealed.
	  - Gasket gap.	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
6. Dew and ice formation.	4) Dew on door. - Dew on the duct door. - Duct door heater is cut. - Dew on the dispense recess. — Recess Heater is cut. / Duct door is open. / Foreign material clogging. - Dew on the door surface. — Not fully filled. — Surface. / Cormer. — Liquid shortage. / Liquid leak. P/U liquid contraction. — Liquid shortage. / Liquid leak. - Dew on the gasket surface. — Bad wing adhesion. — Wing sag(lower part). / Door liner shape mismatch. Corner. — Too much notch. / Broken. Home Bar heater is cut. 5) Water on the floor. - Dew in the refrigerator compartment. - Defrosted water overflows. — Clogged discharging hose. - Discharging hose location. — Evaporation tray located at wrong place. - Tray drip. — Damaged. / Breaks, holes. / Small Capacity. - Position of drain.	
7. Sounds	1) Compressor compartment operating sounds. - Compressor sound inserted. — Sound from machine itself. / Sound from vibration. Restrainer. Rubber seat. — Too hard. / Distorted. / Aged. / Burnt. Stopper. — Bad Stopper assembly. — Not fit (inner diameter of stopper). / Tilted. / Not Compressor base not connected. Bad welding compressor stand(fallen). Foreign materials in the compressor compartment. - O.L.P. sound. — Chattering sound. Insulation paper vibration. - Capacitor noise. Pipe sound. — Pipe contacts each other. – Narrow interval. No vibration damper. — Damping rubber-Q. / Damping rubber-S. Capillary tube unattached.	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
7. Sounds	1) Compressor compartment operating sounds. Transformer sound. — Its own fault. — Core gap. Bad connection. — Correct screw connection. Drip tray vibration sound. — Bad assembly. Distortion. Foreign materials inside. Back cover machine sound. — Bad connection. Partly damaged. Condenser drain sound. — Not connected. Bad pipe caulking. 2) Freezer compartment sounds. Fan motor sound. — Normal operating sound. Vibration sound. — Aged rubber seat. Bad torque for assembling motor bracket. Sounds from fan contact. — Fan guide contact. Shroud burr contact. Damping evaporator contact. Residual frost contact. — Poor treatment Cord heater. Narrow evaporator interval. Unbalance fan sounds. — Unbalance. — Surface machining conditions. Fan distortion. Misshappen. Burr. Ice on the fan. — Air intake (opposite to motor rubber assembly.) Motor shaft contact sounds. — Supporter disorted. Tilted during motor assembly. Resonance. Evaporator noise. — Evaporator pipe contact. — No damping evaporator. Sound from refrigerant. — Stainless steel pipe shape in accumulator. Sound from fin evaporator and pipe during expansion and contraction. 3) Bowls and bottles make contact on top shelf. 4) Refrigerator roof contact. 5) Refrigerator side contact. 6) Insufficient Lubricants on door hinge.	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
8. Faulty lamp (freezer and refrigerator compartment).	1) Lamp problem. — Filament blows out. / Glass is broken. 2) Bad lamp assembly. — Not inserted. / Loosened by vibration. 3) Bad lamp socket. Disconnection. — Bad soldering. / Bad rivet contact. Short. — Water penetration. — Low water level in tray. Bad elasticity of contact. Bad contact(corrosion). 4) Door switch. — Its own defect. / Refrigerator and freezer switch is reversed. / Travlel distance. / Bad connection. / Bad terminal contact. / P/U liquid leak..	
9. Faulty internal voltage(short).	1) Lead wire is damaged. Wire damage when assembling P.T.C. Cover. Outlet burr in the bottom plate. Pressed by cord heater. lead wire, evaporator pipe. 2) Exposed terminal. Compressor Compartment terminal. - Touching other components. Freezer compartment terminal. - Touching evaporator pipe. 3) Faulty parts. Transformer. — Coil contacts cover. / Welded terminal parts contact cover. Compressor. — Bad coil insulation. Plate heater. Melting fuse. — Sealing is broken. — Moisture penetration. Cord heater. — Pipe damaged. — Moisture penetration. / Bad sealing. Sheath heater.	■ Connect conduction and non-conduction parts and check with tester. Conduction: NG. Resistance∞: OK.

TROUBLE DIAGNOSIS

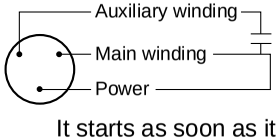
CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
10. Structure, appearance and others.	1) Door foam. Sag. — Weak torque of hinge connection. — Bolt is loosened during transportaion. Not tightly fastened. Screw worn out . Weak gasket adhesion. — Adhesion surface. Fixed tape. — Not well fixed. Noise during operation. — Hinge interference. — Bigger door foam. Hinge-Pin tilted-Poor flatness. No washer. No grease and not enough quantity. Malfunction. — Not closed Interference between door liner and inner liner. Refrigerator compartment is opened when freezer compartment is closed (faulty stopper). — Stopper worn out. Bad freezer compartment door assembly. No stopper. 2) Odor. Temperature of refrigerator compartment. — High. — Faulty damper control. Button is set at "weak". Door is open (interference by food). Deodorizer. — No deodorizer. Poor capacity. Food Storage. — Seal condition. Store special odorous food. Long term storage. Others. — Odors from chemical procucts.	

2. Faults

2-1. Power

Problems	Causes	Checks	Measures	Remarks
No power on outlet.	- Power cord cut. - Faulty connector insertion. - Faulty connection between plug and adapter.	- Check the voltage with tester. - Check visually. - Check visually.	-Replace the components. -Reconnect the connecting parts. - Reconnect the connecting parts.	
Fuse blows out.	- Short circuit by wrong connection. - Low voltage products are connected to high voltage. - Short circuit by insects. - Electricity leakage. - High voltage. - Short circuit of components (tracking due to moisture and dust penetration).	- Check the fuse with tester or visually. - Check the input volt are with tester (between power cord and products). - Check the resistance of power cord with testerf (if it is 0Ω, it is shorted).	- Find and remove the cause of problem(ex. short, high voltage, low voltage). - Replace with rated fuse.	- Replace with rated fuse after confirming its specification. ■ If fuse blowns out frequently, reconfirm the cause and prevent.

2-2. Compressor

Problems	Causes	Checks	Measures	Remarks
Compressor does not operate.	- Faulty PTC.	- Check the resistance. Vlaue:∞ is defective.	- If resistance is infinite, replace it with new one. - If it is not infinite, it is normal. - Check other parts.	
	- Compressor is frozen.	- If compressor assembly parts are normal(capacitor, PTC, OLP), apply power directly to the compressor to force operation.  OLP It starts as soon as it is contacted.	- During forced operation: - Operates: Check other parts. - Not operate: Replace the frozen compressor with new one, weld, evacuate, and recharge refrigerant. • Refer to weld repair procedures.	

2-3. Temperature

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Poor cool air circulation due to faulty fan motor.	- Lock –– Check resistance with a tester. 0Ω: short. ∞Ω: cut. - Rotate rotor manually and check rotation. - Wire is cut. - Bad terminal contact: Check terminal visually. - Fan constraint. – Fan shroud contact: Confirm visually. – Fan icing: Confirm visually.	- Replace fan motor. - Reconnect and reinsert. - Maintain clearance and remove ice (Repair and/or replace shroud if fan is constrained by shroud deformation).	
	Faulty fan motor due to faulty door switch operation.	- Iced button (faulty) operation: Press button to check - Faulty button pressure and contact: Press button to check operation. - Door cannot press door switch button: Check visually.	- Confirm icing causes and repair. - Replace door switch. - Door sag: fix door. - Door liner bent:replace door or attach sheets.	
	Bad radiation conditions in compressor compartment.	- Check the clearance between the refrigerator and wall (50 mm in minimum). - Check dust on the grill in compressor compartment. - Check dust on the coils condenser.	- Keep clearance between refrigerator and walls (minimum 50mm). - Remove dust and contaminants from grill for easy heat radiation. - Remove the dust with vacuum cleaner from the coils condenser while the refrigerator is off.	- The fan may be broken if cleaning performs while the refrigerator is on.

2-4. Cooling

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Refrigerant leak.	Check sequence 1. Check the welded parts of the drier inlet and outlet and drier auxiliary in the compressor compartment (high pressure side). 2. Check the end of compressor sealing pipe (low pressure side). 3. Check silver soldered parts. (Cu + Fe / Fe + Fe). 4. Check bending area of wire condenser pipe in compressor compartment (cracks can happen during bending). 5. Check other parts (compressor compartment and evaporators in freezer compartment).	Weld the leaking part, recharge the refrigerant.	Drier must be replaced.
	Shortage of refrigerant.	Check frost formation on the surface of evaporator in the freezer compartment. - If the frost forms evenly on the surface, it is OK. - If it does not, it is not good.	- Find out the leaking area, repair, evacuate, and recharge the refrigerant. - No leaking, remove the remaining refrigerant, and recharge new refrigerant.	Drier must be replaced.

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Cycle pipe is clogged.	Check sequence. 1. Check temperature of condenser manually. If it is warm, it is OK. If it is not, compressor discharging joints might be clogged. 2. Manually check whether hot line pipe is warm. If it is warm, it's OK. If it is not, condenser outlet weld joints might be colgged.	- Heat up compressor discharging weld joints with touch, disconnect the pipes, and check the clogging. Remove the causes of clogging, weld, evacuate, and recharge the refrigerant. - If it's warm, it's OK. If it's not, condenser discharging line weld joints might be clogged. Disconnect with torch, remove the causes, evacuate, and recharge seal refrigerant.	Direr must be replaced.
	Leak at loop pipe weld joint (discharge) in compressor.	Check sequence. 1. Manually check whether condenser is warm, It is not warm and the frost forms partly on the evaporator in the freezer compartment.	Replace the compressor, weld, evacuate, and recharge refrigerant.	Drier must be replaced.
	Faulty cooling fan in the compressor compartment.	Check sequence. 1. Check cooling fan operation. 2. Check that cooling fan is disconnected from the motor.	- Replace if motor does not operate. - If fan is disconnected, check fan damage and reassemble it. ■ Refer to fan motor disassembly and assembly sequence.	

2-5. Defrosting failure

Problems	Causes	Checks	Measures	Remarks
No defrosting.	Heater does not generate heat as the heating wire is cut or the circuit is shorted. 1) Heating wire is damaged when inserting into the evaporator. 2) Lead wire of heater is cut. 3) Heating wire at lead wire contacts is cut.	1. Check the resistance of heater. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: OK. 2. Check the resistance between housing terminal and heater surface. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: Short.	Heating wire is short and wire is cut. • Parts replacement: Refer to parts explanations.	Seal the lead wire with insulation tape and heat contraction tube if the cut lead wire is accessible to repair.
	Sucking duct and discharging hole are clogged: 1. Impurities. 2. Ice.	1. Confirm foreign materials. In case of ice, insert the copper line through the hole to check. 2. Put hot water into the drain (check drains outside).	1) Push out impurities by inserting copper wire.(Turn off more than 3hours and pour in hot water if frost is severe.) 2) Put in hot water to melt down frost. 3) Check the water outlet. 4) Push the heater plate to sucking duct manually and assemble the disconnected parts.	
	Gap between Sucking duct and Heater plate(Ice in the gap).	1. Confirm in the Sucking duct.	1) Turn off the power, confirm impurities and ice in the gap, and supply hot water until the ice in the gap melts down. 2) Push the Heater plate to drain bottom with hand and assemble the disconnected parts.	
	Wrong heater rating (or wrong assembly).	1. Check heater label. 2. Confirm the capacity after substituting the resistance value into the formula. $P=\frac{V^2}{R}$ (V: Rated voltage of user country) (R: Resistance of tester[Ω]) Compare P and lavel capacity. Tolerance: ±7%	Faults:replace. - How to replace: Refer to main parts.	

Problems	Causes	Checks	Measures	Remarks
No defrosting	Melting fuse blows out. 1) Lead wire is cut. 2) Bad soldering.	- Check melting fuse with tester. - If 0Ω: OK. If ∞Ω: wire is cut.	Faullty parts: parts replacement. - Check wire color when maeasuring resistance with a tester.	
	Ice in the Sucking duct. 1) Icing by foreign materials in the duct. 2) Icing by cool air inflow through the gap of heater plate. 3) Icing by the gap of heater plate.	1. Check the inner duct with mirror. 2. Check by inserting soft copper wire into the duct (soft and thin copper not to impair heating wire).	1) Turn power off. 2) Raise the front side(door side), support the front side legs, and let the ice melt naturally. (If power is on, melt the frost by forced defrosting.) 3) Reassemble the heater plate.	
	Bad cool air inflow and discharge, and bad defrosting due to faulty contact and insertion (bad connector insertion into housing of heater, melting, fuse and motor fan).	1. Turn on power, open or close the door, check that motor fan operates (If it operates, motor fan is OK). 2. Disconnect parts in the refrigerator compartment, check the connection around the housing visually, defrost, and confirm heat generation on the heater. Do not put hands on the sheath heater. 3. Check the parts which have faults described in 1, 2 (mechanical model: disconnect thermostat from the assembly).	1) Check the faulty connector of housing and reassemble wrongly assembled parts. 2) If the parts are very damaged, remove the parts and replace it with a new one.	

2-6. Icing

Problems	Causes	Checks	Measures	Remarks
Icing in the refrigerator compartment. - Damper icing. - Pipe icing. - Discharging pipe icing.	1) Bad circulation of cool air. - Clogged intake port in the refrigerator compartment. - Sealing is not good. - Too much food is stored and clogs the discharge port. - Bad defrosting.	- Check the food is stored properly (check discharge and intake port are clogged). - Check icing on the surface of baffle and cool air path (pipe) after dissembling the container box. - Check icing at intake ports of freezer and refrigerator compartment.	- Be acquainted with how to use. - Sealing on connecting parts. - Check the damper and replace it if it has defects. - Check defrost. (After forced defrosting, check ice in the evaporator and pipes.)	- Check the defrost related parts if problem is caused by faulty defrosting.
	2) Faulty door or refrigerator compartment. - Faulty gasket. - Faulty assembly.	- Check gasket attached conditions. - Check door assembly conditions.	- Correct the gasket attachment conditions and replace it. - Door assembly and replacement.	- Replacement should be done when it cannot be repaired.
	3) Overcooling in the refrigerator compartment. - Faulty damper in the refrigerator compartment. - Faulty MICOM (faulty sensor)	- Check refrigerator compartment is overcooled (when button pressed on "weak"). - Check parts are faulty.	- Replace faulty parts.	
	4) Bad defrosting - Heater wire is cut. - Defective defrost sensor. - Defrosing cycle.	- Check frost on the evaporator after dissembling shroud and fan grille. - Check ice on intake port of freezer and refrigerator compartment.	- Check parts related to defrosting. - Check defrosting. (Check ice on the evaporator and pipe.)	- Moisture cannot frost on the evaporator but can be sucked into the refrigerator, being condensed and iced, interferes with cool air circulation, and suppresses sublimation.
	5) Customers are not familiar with this machine. - Door opens. - High temperature, high moisture, and high load.	- Check food interferes with door closing. - Check ice on the ceilings.	- Be acquainted with how to use.	

Problems	Causes	Checks	Measures	Remarks
Ice in the freezer compartment. - Surface of fan grille. - Wall of freezer compartment. - Cool air discharging port. - Basket(rack) area. - Food surface. - Icing in the shute.	1) Bad cooling air circulation. - Intake port is colgged in the freezer compartment. - Discharging port is Clogged. - Too much food is stored. - Bad defrosting.	- Check food storage conditions visually.(Check clogging at intake and discharging port of cooling air.) - Check food occupation ratio in volume(Less than 75%). - Check frost on the evaporator after dissembling shroud and fan grille. - Check icing at intake port of refrigerator compartment.	- Be acquainted with how to use. - Check defrost (Check ice on the evaporator and pipes after forced defrosting).	- Check the parts related to defrosting if the problem is caused by the faulty defrosting.
	2) Bad freezer compartment door - Faulty gasket - Faulty assembly	- Check gasket attachment conditions. - Check door assembly conditions.	- Correct the gasket attachement conditions and replace it. - Door assembly and replacement.	- Replace when it can not be repaired.
	3) Over freezing in the freezer compartment. - Faulty MICOM.	- Refrigerator operates pull down. (Check if it is operated intermittently) - The Temperature of freezer compartment is satisfactory, but over freezing happens in the refrigerator compartment even though the notch is set at "weak".	-Replace defective parts.	
	4) Bad defrosting. - Heater wire is cut. - Faulty defrost sensor. - Defrosting cycle	- Check frost on the evaporator after dissembling shroud and grille. - Check ice on the intake port in the refrigerator compartment.	- Check parts related to defrosting. - Check defrosting.(Check ice on the evaporator and pipes after forced defrosting.)	
	5) User is not familiar with how to use. - Door opens. - High moisture food(water) is stored.	- Check food holds door open. - Check ice on the ice tray.	- Be acquainted with how to use.	

2-7. Sound

Problems	Causes	Checks	Measures	Remarks
"Whizz" sound	1. Loud sound of compressor operation.	1.1 Check the level of the refrigerator. 1.2 Check the rubber seat conditions (sagging and aging).	1) Maintain horizontal level. 2) Replace rubber and seat if they are sagged and aged. 3) Insert rubber where hand contact reduces noise in the pipe. 4) Avoid pipe interference. 5) Replace defective fan and fan motor. 6) Adjust fan to be in the center of bell mouth of the fan guide. 7) Leve a clearance between interfering parts and seal gaps in the structures. 8) Reassemble the parts which make sound. 9) Leave a clearance if evaporator pipes and suction pipe touch freezer shroud.	
	2. Pipes resonat sound which is connected to the compressor.	2.1 Check the level of pipes connected to the compressor and their interference. 2.2 Check rubber inserting conditions in pipes. 2.3 Touch pipes with hands or screw -driver (check the change of sound).		
	3. Fan operation sound in the freezer compartment.	3.1 Check fan insertion depth and blade damage. 3.2 Check the interference with structures. 3.3 Check fan motor. 3.4 Check fan motor rubber insertion and aging conditions.		
	4. Fan operation sound in the compressor compartment.	4.1 Same as fan confirmation in the refrigerator. 4.2 Check drip tray leg insertion. 4.3 Check the screw fastening conditions at condenser and drip tray.		

Problems	Causes	Checks	Measures	Remarks
Vibration sound. ("Cluck")	1. Vibration of shelves and foods in the refrigerator. 2. Pipes interference and capillary tube touching in the compressor. compartment. 3. Compressor stopper vibration. 4. Moving wheel vibration. 5. Other structure and parts vibration.	1-1. Remove and replace the shelves in the refrigerator 1-2. Check light food and container on the shelves. 2-1. Touch pipes in the compressore compartment with hands. 2-2 Check capillary tube touches cover back. 3-1 Check compressor stopper vibration. 4-1 Check vibration of front and rear moving wheels. 5-1 Touch other structures and parts.	1) Reassemble the vibrating parts and insert foam or cushion where vibration is severe. 2) Leave a clearance where parts interfere with each other. 3) Reduce vibration with rubber and restrainer if it is severe. (especially, compressor and pipe). 4) Replace compressor stopper if it vibtates severely.	
Irregular sound. ("Click").	1. It is caused by heat expansion and contraction of evaporator, shelves, and pipes in the refrigerator.	1-1 Check time and place of sound sources.	1) Explain the principles of refrigeration and that the temperature difference between operation and defrosting can make sounds. 2) If evaporator pipe contacts with other structures, leave a clearance between them (freezer shroud or inner case).	

Problems	Causes	Checks	Measures	Remarks
Sound "Burping" (almost the same as animals crying sound).	It happens when refrigerant expands at the end of capillary tube.	- Check the sound of refrigerant at the initial installation. - Check the sound when the refrigerator starts operation after forced defrosting. - Check the restrainer attachment conditions on the evaporator and capillary tube weld joints.	- Check the restrainer attached on the evaporator and capillary tube weld joints and attach another restrainer. - If it is continuous and servere, insert capillary tube again (depth:15±3mm) - Fasten the capillary tube to suction pipes or detach in the compressor compartment. - Explain the principles of freezing cycles.	
Water boiling or flowing sound.	It happens when refrigerant passes orifice in accumulator internal pipes by the pressure difference between condenser and evaporator.	- Check the sound when compressor is turned on. - Check the sound when compressor is turned off.	- Explain the principles of freezing cycles and refrigerant flowing phenomenon by internal pressure difference. - If sound is servere, wrap the accumulator with foam and restrainer.	
Sound of whistle when door closes.	When door closes, the internal pressure of the refrigerator decreases sharply below atomosphere and sucks air into the refrigerator, making the whistle sound.	- Check the sound by opening and closing the refrigerator or freezer doors.	- Broaden the cap of discharge hose for defrosting in the compressor compartment. - Seal the gap with sealant between out and inner cases of hinge in door.	

2-8. Odor

Problems	Causes	Checks	Measures	Remarks
Food Odor.	Food (garlic, kimchi, etc)	- Check the food is not wrapped. - Check the shelves or inner wall are stained with food juice. - Check the food in the vinyl wraps. - Chedk food cleanliness.	- Dry deodorizer in the shiny and windy place. - Store the food in the closed container instead of vinyl wraps. - Clean the refrigerator and set button at "strong".	
Plastic Odor.	Odors of mixed food and plastic odors.	- Check wet food is wrapped with plastic bowl and bag. - It happens in the new refrigerator.	- Clean the refrigerator. - Persuade customers not to use plastic bag or wraps with wet food or odorous foods.	
Odor from the deodorizer.	Odor from the old deodorizer.	- Check the deodorizer odors.	- Dry the deodorizer with dryer and then in the shiny and windy place. - Remove and replace the deodorants.	*Deodorizer : option

2-9. Micom

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad PCB electric power.	All display LEDS are off.	Bad connection between Main PCB and display circuit.	Bad connector connection from main PCB to display PCB.	Visual check on connector connection.	Reconnect connector.	
		Defective PCB trans.	PCB Trans winding is cut.	Check resistance of PCB Trans input and output terminals with a tester. (If resistance is infinity, trans winding is cut).	Replace PCB Trans or PCB.	Applicable to model without dispenser.
			PCB Trans temperature fuse is burnt out.			
		DefectivePCB electric circuit parts.	Defective regulator IC (7812, 7805).	Check voltage at input/output terminals.	Replace regulator.	Refer to electric circuit in circuit explanation.
			PCB electric terminal fuse is burnt out.	Check fuse in PCB electric terminal with a tester.	Replace PCB fuse.	
			STR Parts are damaged.	Check if STR No. 2 and 3 pins are cut when power is off.	Replace parts.	Applicable to model with dispenser.
	Abnormal display LED operation	Bad connection between Main PCB and display circuit.	Lead Wire connecting main PCB and display PCB is cut or connector terminal connection is bad.	Check Lead Wire terminals connecting Main PCB and display PCB with a tester.	Reconnect Lead Wire and directly connect defective contact terminal to Lead Wire.	
		Defective LED module.	Defective LED.	Check if all LEDs are on when Main PCB Test switch is pressed (or when both freezer key and power freezer key are pressed at the same time for more than one second.)	Replace display PCB.	Refer to display circuit in circuit explanation.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling.	Freezer temperature is high.	Compressor does not start.	Compressor Lead Wire is cut.	Check compressor Lead Wire with a tester.	Reconnect Lead Wire.	
			Defective compressor driving relay.	Measure voltage at PCB CON1 (5&7) after pressing main PCB test switch once. It is OK if voltage is normal.	Replace relay (RY1) or PCB.	Refer to load driving circuit in circuit explanation.
		Defective freezer sensor.	Defective Freezer sensor parts.	Check resistance of freezer sensor with a tester.	Replace freezer sensor.	Refer to resistance characteristics table of sensor in circuit
			Freezer sensor is substituted for other sensor.	Confirm the color of sensor in circuits (main PCB sensor housing).	Repair main PCB sensor housing	explanation.
		Defective freezer fan motor.	Fan motor lead wire is cut.	Check fan motor lead wire with a tester.	Reconnect lead wire.	
			• Defective door switch (freezer, refrigerator, home bar). • Defective fan motor. • Defective fan motor driving relay.	Measure the voltage between PCB power blue line and fan motor after pressing test switch of Main PCB. If the voltage is normal, it is OK.	• Replace door switch (freezer, refrigerator and home bar). • Replace fan motor.	Refer to load driving circuits in circuit explanation.
		Faulty defrost.		Refer to faulty defrost items in trouble diagnosis functions.		Refer to trouble diagnosis function.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling	Wrong Refrigerator temperature.	Defective AC Damper.	Check AC damper motor and reed switch and lead wire are cut.	Check if AC damper motor and reed switch lead wire are cut with a tester.	Reconnect lead wire.	
			Check AC damper part.	Refer to AC damper in parts repair guide.	Replace AC damper or refrigerator control box Assembly.	
			Check AC damper Motor driving relay in PCB.	Refer to AC damper in parts repair guide.	Replace relay or PCB.	Refer to single motor damper driving circuits in circuit explanation.
			Foreign materials in AC damper baffles	Check AC damper baffle visually.	Remove foreign materials.	
			Ice formation on AC damper baffles	Check if AC damper Heater wire is cut with a tester.	Replace AC damper or refrigerator control Box Assembly.	
		Defective refrigerator sensor	Defective refrigerator sensor parts.	Check the resistance of refrigerator sensor with a tester.	Replace refrigerator sensor.	Refer to sensor resistance characteristic table in circuit explanation.
			Refrigerator sensor is substituted for other sensor.	Check the sensor color in the circuit. (main PCB sensor housing.)	Repair main PCB sensor housing.	
			Defective refrigerator sensor assembly condition.	Check if refrigerator sensor is not fixed at cover sensor but inner case visually.	Fix again the refrigerator sensor.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Bad defrost.	Defrost is not working.	Defrost lead wire is cut.	Check if defrost lead wire is cut with a tester.	Reconnect Lead Wire.	
		Defective defrost driving relay.	Check the voltage of CON2 with a tester after pressing main PCB test switch twice. If the voltage is normal then it is OK.	Replace relay or PCB.	Refer to load driving conditions check in circuit explanation.
		Defective defrost sensor parts.	Check the resistance of defrost sensor with a tester.	Replace defrost sensor.	Refer to sensor resistance characteristic table of circuit explanation.
Defective buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire related to door switch with a tester.	Repair lead wire.	
		Defective door switch parts.	Refer to door switch in parts repair guide.	Replace door switch.	
Defective display button	Buzzer does not ring and key does not sense even button is pressed.	Key input wire is cut or bad connector terminal contact in main PCB and display PCB connecting lead wire.	Check input wire with a tester.	Reconnect lead wire and replace or directly connect bad contact terminal to lead wire.	Refer to display circuit in circuit explanation.
		Key is continuously depressed due to structural interference.	Disassemble frame display and confirm visually.	Adjust or replace interfering structures.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Defective display button.	Buzzer rings but key does not sense even button is pressed.	Trouble mode indication.	Check trouble diagnosis function.	Repair troubles	Refer to mode indication in function explanations.
Door Buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire associated with door switch.	Repair lead wire.	Check model with dispenser.
		Defective freezer compartment door switch parts.	Refer to door switch in parts repair guide.	Replace Freezer compartment door switch.	
Bad water/ice dispenser.	Ice and water are not dispensed.	Defective connecting lead wire from Main PCB to lever switch.	Check Lead Wire associated with lever switch with a tester.	Repair lead wire.	
		Defective lever switch parts	Refer to door switch in parts repair guide.	Replace lever switch.	
		Defective photo coupler IC parts.	Check voltage change at photo coupler output terminals with lever switch pressed. It is OK if voltage change is between 0V - 5V.	Replace photo coupler IC or PCB.	
		Defective relay associated with ice dispense (geared motor, cube and dispenser solenoid).	Check relay with a tester.	Replace defective relay.	
		Defective parts associated with ice dispense (geared motor, cube and dispenser solenoid).	Check resistance of parts with a tester.	Replace defective parts.	
		Defective relay associated with water dispense.	Check relay with a tester	Replace defective relay.	
		Defective parts associated with water dispenser.	Check resistance of parts with a tester.	Replace defective parts.	

TROUBLE DIAGNOSIS

3. Cooling Cycle Heavy Repair

3-1. The Heavy Repair Standards for Refrigerator with R134a Refrigerant

NO.	Items		Unit	Standards	Purposes	Remarks
1	Pipe and piping system opening time.		Min.	Pipe:within 1 hour. Comp:within 10 minutes. Drier:within 20 minutes.	To protect Moisture Penetration.	The opening time should be reduced to a half of the standards during rain and rainy seasons (the penetration of water into the pipe is dangerous).
2	Welding.		Nitrogen Pressure.	Weld under Nitrogen atmosphere (N_2 pressure: 0.1~0.2 kg/cm^2)	To protect oxide scale formation.	- Refet to repair note in each part. - R134a refrigerant is more susceptible to leaks than R12 and requires more care during welding. - Do not apply force to pipes before and after welding to protect pipe from cracking.
3	N_2 sealed parts.		Confirm N_2 leak.	Confirm air leaking sounds when removing rubber cap. Sound:usable No sound:not usable	To protect moisture penetration.	- In case of evaporator parts, if it doesn't noise when removing rubber cap blow dry air or N_2 gas for more than 1 min use the parts.
4	Refrigeration Cycle.	Evacuation time	Min.	More than 40 minutes.	To remove moisture.	
		Vacuum degree	Torr	Below 0.03(ref)		Note:Only applicable to the model equipped with reverse flow protect plate.
		Vacuum	EA	High and low Pressure sides are evacuated at the same time for models above 200 ℓ		Vaccum efficiency can be improved by operating compressor during evacuation.
		Vacuum piping	EA	Use R134a exclusive manifold.	To protect mixing of mineral and ester oils.	The rubber pipes for R12 refrigerant shall be melted when they are used for R134a refrigerant(causes of leak).
		Pipe coupler	EA	Use R134a cxclusive.	To protect R12 Refri-gerant mixing.	
		Outlet (Socket)		R134a exclusive.		
		Plug		R134a exclusive		
5	Refrigerant weighing.		EA	Use R134a exclusively. Weighing allowance:±5g Note:Winter:-5g Summer:+5g	Do not mix with R12 refrigerant.	- Do not weight the refrigerant at too hot or too cold an area.(25°C is adequate.) - Use copper bombe Socket:2SV Plug: 2PV R134a Note:Do not burn O-ring (rubber) during welding.
6	Drier replacement.			-Use R134a exclusively for R134a refrigerator -Use R12 exclusively for R12 refrigerator -Replace drier whenever repairing refrigerator cycle piping.	To remove the moisture from pipe.	
7	Leak check.			-Do not use soapy water for check. it may be sucked into the pipe by.	Detect refrigerant leak area.	-Check oil leak at refrigerant leak area. Use electronic leak detector if oil leak is not found. -The electronic leak detector is very sensitive to halogen gas in the air. It also can detect R141b in urethane. Please practice, therfore, many times before use.

NOTE) Please contact Songso company on +82-53-554-2067 if you have inquiry on heavy repair special facility.

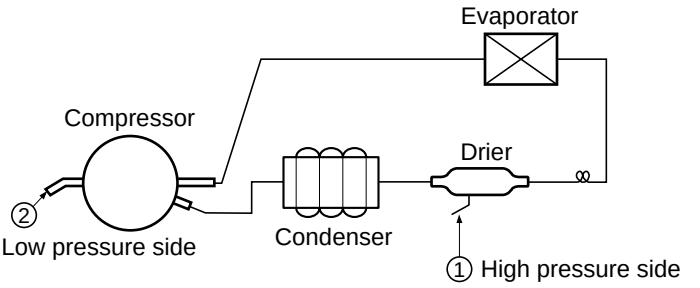
TROUBLE DIAGNOSIS

3-2. Summary Of Heavy Repair

Process	Contents	Tools
Trouble diagnosis		
Remove refrigerant Residuals	- Cut charging pipe ends and discharge refrigerant from drier and compressor.	Filter, side cutters
Parts replacement and welding	- Use R134a oil and refrigerant for compressor and drier - Confirm N_2 sealing and packing conditions before use. Use good one for welding and assembly. - Weld under nitrogen gas atmosphere.(N_2 gas pressure: 0.1-0.2kg/cm^2). - Repair in a clean and dry place.	Pipe Cutter, Gas welder, N_2 gas
Vacuum	- Evacuate for more than forty minutes after connecting manifold gauge hose and vacuum pump to high (drier) and low (compressor refrigerant discharging parts) pressure sides. - Evacuation Speed:113//min.	Vacuum pump(R134a exclusively), Manifold gauge.
Refrigerant charging and charging inlet welding	- Weigh and control the allowance of R134a bombe in a vacuum conditions to be ±5 g with electronic scales and charge through compressor inlet (Charge while refrigerator operates). - Weld carefully after inlet pinching.	R134a exclusive bombe(mass cylinder), refrigerant(R134a) manifold gauge, electronic scales, punching off flier, gas welding machine
Check refrigerant leak and cooling capacity	- Check leak at weld joints. ┌ Minute leak: Use electronic leak detector └ Big leak: Check visually or fingers. Note:Do not use soapy water for check. - Check cooling capacity ① Check radiator manually to see if warm. ② Check hot line pipe manually to see if warm. ③ Check frost formation on the whole surface of the evaporator.	Electronic Leak Detector, Driver(Ruler).
Compressor compartment and tools arrangement	- Remove flux from the silver weld joints with soft brush or wet rag.(Flux may be the cause of corrosion and leaks.) - Clean R134a exclusive tools and store them in a clean tool box or in their place.	Copper brush, Rag, Tool box
Transportation and installation	- Installation should be conducted in accordance with the standard installation procedure.(Leave space of more than 5 cm from the wall for compressor compartment cooling fan mounted model.)	

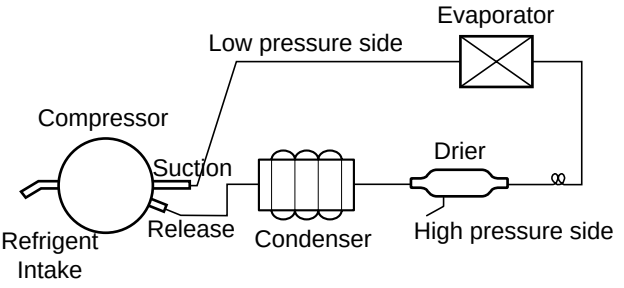
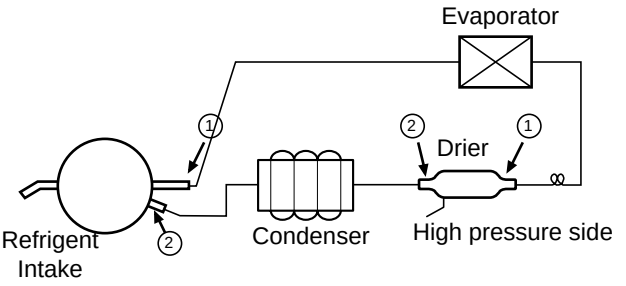
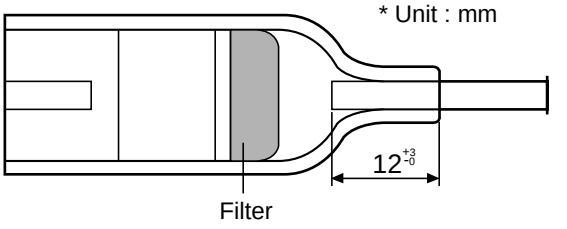
TROUBLE DIAGNOSIS

3-3. Precautions During Heavy Repair

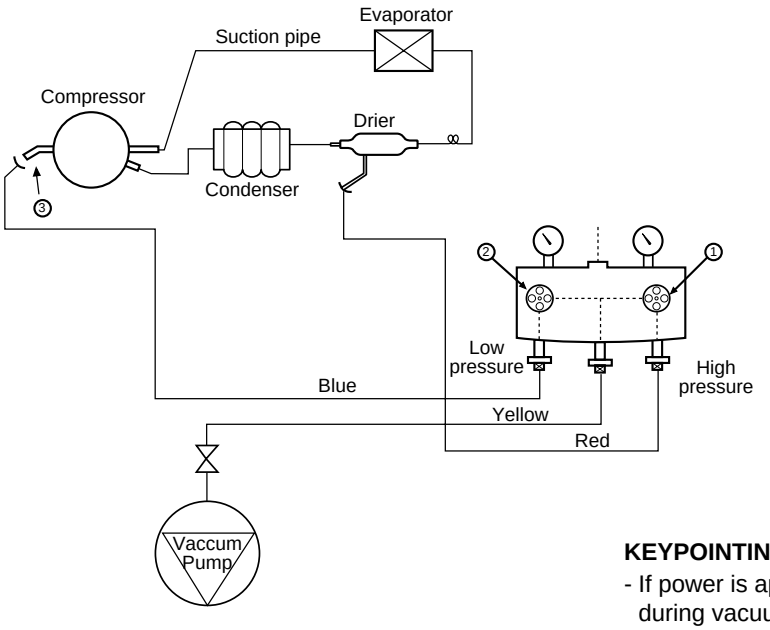
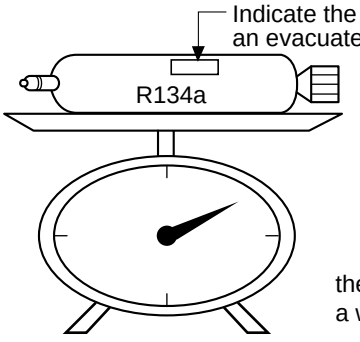
Items	Precautions
1. Use of tools.	1) Use special parts and tools for R134a.
2. Removal of retained refrigerant.	1) Remove retained refrigerant more than 5 minutes after turning off a refrigerator. (If not, oil will leak inside.) 2) Remove retained refrigerant by cutting first high pressure side (drier part) with a nipper and then cut low pressure side. (If the order is not observed, oil leak will happen.) 
3. Replacement of drier.	1) Be sure to replace drier with R134a only when repairing pipes and injecting refrigerant.
4. Nitrogen blowing welding.	1) Weld under nitrogen atmosphere in order to prevent oxidation inside a pipe. (Nitrogen pressure : 0.1~0.2 kg/cm^2.)
5. Others.	1) Nitrogen or refrigerant R134a only should be used when cleaning inside of cycle pipes inside and sealing. 2) Check leakage with an electronic leakage tester. 3) Be sure to use a pipe cutter when cutting pipes. 4) Be careful not the water let intrude into the inside of the cycle.

TROUBLE DIAGNOSIS

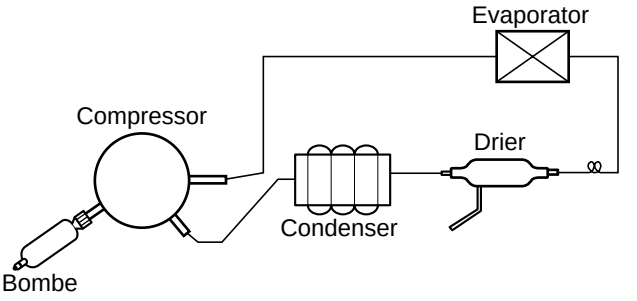
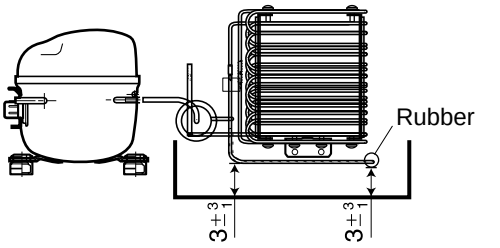
3-4. Practical Work For Heavy Repair

Items	Precautions
1. Removal of residual refrigerant.	 **KEYPOINTING** Observe the sequence for removal of refrigerant. (If not, compressor oil may leak.) 1) Remove residual refrigerant more than 5 minutes later after turning off the refrigerator. (If not, compressor oil may leak inside.) 2) Remove retained refrigerant slowly by cutting first high pressure side (drier part) with a nipper and then cut low pressure side.
2. Nitrogen blowing welding.	 **KEYPOINTING** Welding without nitrogen blowing produces oxidized scales inside a pipe, which affect on performance and reliability of a product. **When replacing a drier:** Weld ① and ② parts by blowing nitrogen(0.1~0.2kg/cm^2) to high pressure side after assembling a drier. **When replacing a compressor:** Weld ① and ② parts by blowing nitrogen to the low pressure side. Note) For other parts, nitrogen blowing is not necessary because it does not produce oxidized scales inside pipe because of its short welding time.
3. Replacement of drier.	 **KEYPOINTING** Be sure to check the inserted length of capillary tube when it is inserted. (If too much inserted, a capillary tube is clogged by a filter.) **Inserting a capillary tube** Measure distance with a ruler and put a mark($12^{+3/-0}$)on the capillary tube. Insert tube to the mark, and weld it

TROUBLE DIAGNOSIS

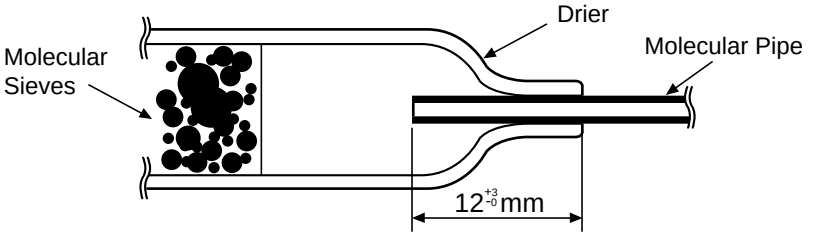
Items	Precautions
4.Vacuum degassing.	 **Pipe Connection** Connect a red hose to the high pressure side and a blue hose to the low pressure side. **Vacuum Sequence** Open ①, ② valves and evacuate for 40 minutes. Close valve ①. **KEYPOINTING** - If power is applied during vacuum degassing, vacuum degassing shall be more effective. - Operate compressor while charging refrigerant. (It is easier and more certain to do like this.)
5.Refrigerant charging.	**Charging sequence** 1) Check the amount of refrigerant supplied to each model after completing vacuum degassing. 2) Evacuate bombe with a vacuum pump. 3) Measure the amount of refrigerant charged. - Measure the weight of an evacuated bombe with an electronic scale. - Charge refrigerant into a bombe and measure the weight. Calculate the weight of refrigerant charged into the bombe by subtracting the weight of an evacuated bombe.  **KEYPOINTING** - Be sure to charge the refrigerant at around 25°C. - Be sure to keep -5g in the winer and +5g in summer **Calculation of amount of refrigerant charged** the amount of refrigerant charged= a weight after charging - a weight before charging (a weight of an evacuated cylinder)

TROUBLE DIAGNOSIS

Items	Precautions
	 4) Refrigerant Charging Charge refrigerant while operating a compressor as shown above. 5) Pinch a charging pipe with a pinch-off plier after completion of charging. 6) Braze the end of a pinched charging pipe with copper brazer and take a gas leakage test on the welded parts.
6. Gas-leakage test	* Take a leakage test on the welded or suspicious area with an electronic leakage tester.
7. Pipe arrangement in each cycle	Check each pipe is placed in its original place before closing a cover back-M/C after completion of work. Particularly control the size of Joint Drain Pipe 

3-5. Standard Regulations For Heavy Repair

1) Observe the safety precautions for gas handling.
2) Use JIG (or wet towel) in order to prevent electric wires from burning during welding. (In order to prevent insulation break and accident.)
3) The inner case shall be melted and insulation material (polyurethane) shall be burnt if not cared during welding inner case parts.
4) The copper pipe shall be oxidized by overheating if not cared during welding.
5) Not allow the aluminum pipes to contact to copper pipes. (In order to prevent corrosion.)
6) Observe that the inserted length of a capillary tube into a drier should be 12^{+3}_{-0} mm.

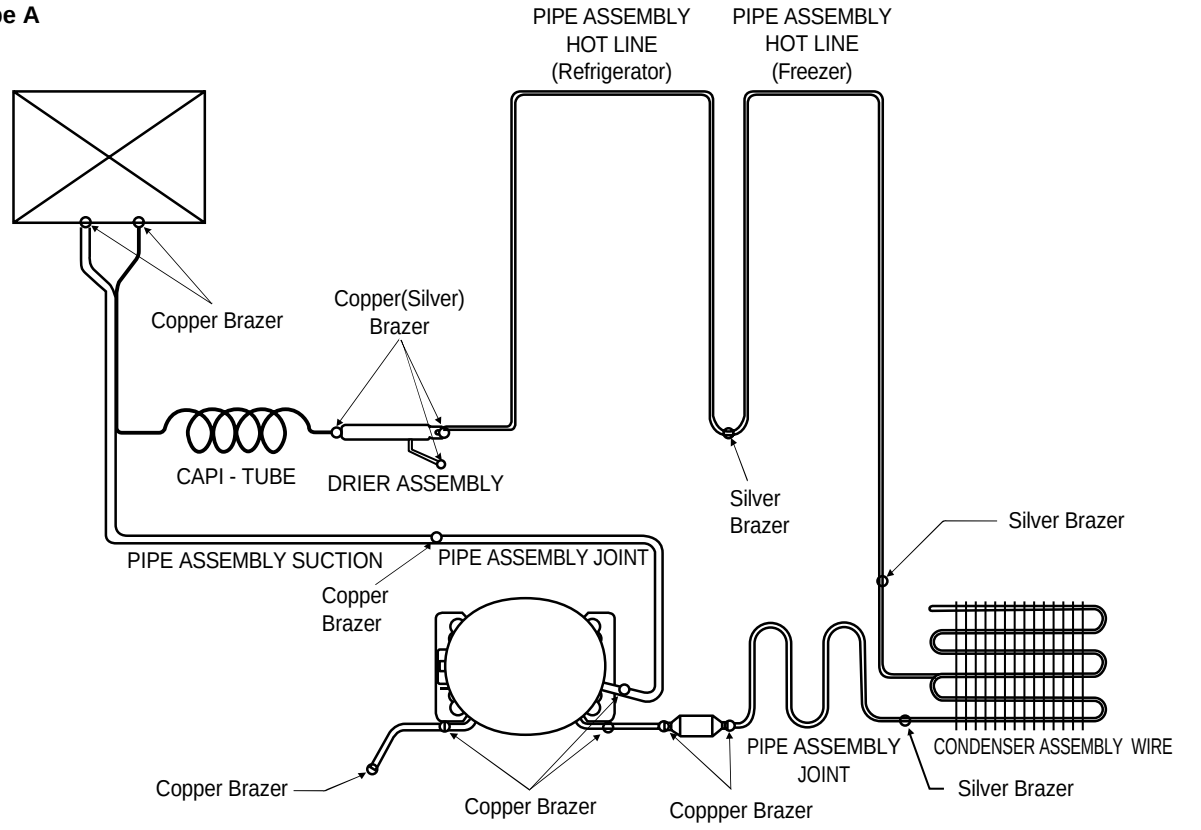


7) Make sure that the inner diameter should not be distorted while cutting a capillary tube.
8) Be sure that a suction pipe and a filling tube should not be substituted each other during welding. (High efficiency pump.)

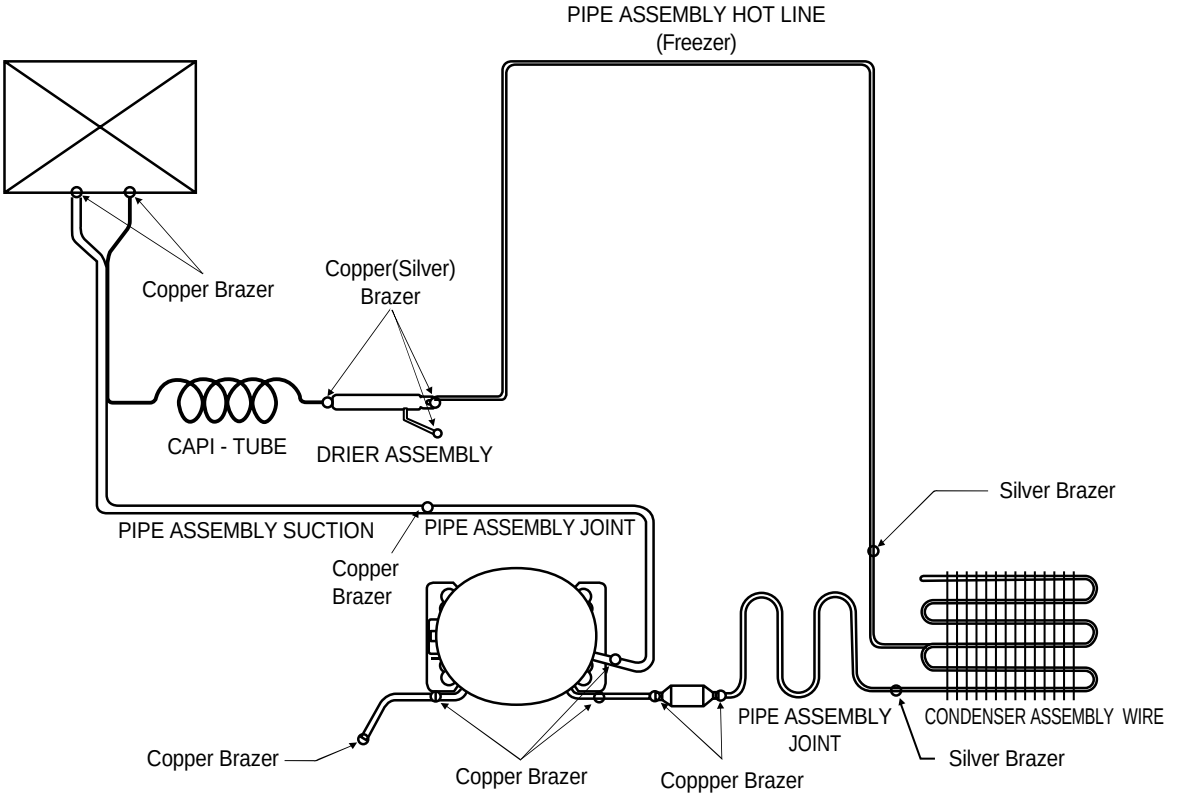
TROUBLE DIAGNOSIS

3-6. Brazing Reference Drawings

1) Type A



2) Type B



TROUBLE DIAGNOSIS

4. HOW TO DEAL WITH CLAIMS

4-1. Sound

Problems	Checks and Measures
"Whizz" sounds	■ **Explain general principles of sounds.** • All refrigerator when functioning properly have normal operating sound. The compressor and fan produce sounds. There is a fan in the freezer compartment which blows cool air to freezer and refrigerator compartments. "Whizz" sounds are heard when the air passes through the narrow holes into the freezer and refrigerator compartments. ■ **Cooling Fan sound in the compressor compartment.** • There is a fan on the back of the refrigerator, which cools the compressor compartment. If there is a small space between the refrigerator and the wall, the air circulation sounds may be noticeable. ■ **Noise of Compressor.** • This operating sound happens when the compressor compresses the refrigerant. The compressor rotates at 3600RPM. The sound of compressor operation becomes louder as the refrigerator capacity increases.
"Click" sounds	■ **Explain the principles of temperature change.** • The sounds happens when pipes and internal evaporator in the refrigerator compartment expand and contract as the temperature changes during the refrigerator operation. This sound also happens during defrosting, twice a day, when the ice on the evaporator melts.
"Clunk" sound	■ **Explain that it comes from the compressor when the refrigerator starts.** • When the refrigerator operates, the piston and motor in the compressor rotate at 3600RPM. This sound is caused by the vibration of motor and piston when they start and finish their operation. This phenomena can be compared with that of cars. When the car engine ignites and starts to rotate, the loud sound becomes gradually quiet. When the engine stops, it stops with vibration.
Vibration sound	■ **Check the sound whether it comes from the pipes vibration and friction.** • Insert rubber or leave a space between pipes to avoid the noise. • Fix the fan blade if the noise is due to the collision of fan and shroud. • Fix the drip tray if it is loosened. ■ **Sound depends on the installation location.** • Sound becomes louder if the refrigerator is installed on a wooden floor or near a wooden wall. Move it to the another location. • If the refrigerator is not leveled properly, a small vibration can make a loud sound. Please adjust the level of the refrigerator.

TROUBLE DIAGNOSIS

Problems	Checks and Measures
Sounds of water flowing	■ **Explain the flow of refrigerant.** • When the refrigerator stops, the water flowing sound happens. This sound happens when the liquid or vapor refrigerant flows from the evaporator to compressor.
"Click" sounds	■ **Explain the characteriistics of moving parts.** • This noise comes from the MICOM controller's switch on the top of the refrigerator when it is turned on and off.
Noise of ice maker operation (applicable to model with ice maker). - Noise produced by ice dropping and hitting ice bank. - Noise from motor sounds “Whizz”.	■ **Explain the procedure and principles of ice maker operation.** • Automatic ice maker repeats the cycle of water supplying → icemaking → ice ejection. When water is supplied, the water supply valve in the machine room makes sounds like “Whizz” and water flowing also makes sound. When water freezes to ice, freezing sounds such as “click, click” are heard. When ice is being ejected, sounds like “Whizz” produced by a motor to rotate an ice tray and ice dropping and hitting ice bank sounds are also heard.
Noise when supplying water.	■ **Explain the principles of water supplied to dispenser.** • When the water supply button in the dispenser is pressed, the water supply valve in the compressor compartment opens and let the water flow to the water tank in the lower part of the refrigerator compartment. The water is dispensed by this pressure. When this happens, motor sound and water flowing sound are heard.
Noise when supplying ice.	■ Explain the principles of ice supply and procedure of crushed ice making in a dispenser. • When ice cube button is pressed, ice stored in the ice bank is moved by a Helix Pusher and dispensed. If crushed ice button is pressed, the cube ice is crushed. When this happens, ice crushing and hitting ice bank sounds are heard.

TROUBLE DIAGNOSIS

4-2. Measures for Symptoms on Temperature

Problems	Checks and Measures
Refrigeration is weak.	■ **Check temperature set in the temperature control knob.** • Refrigerator is generally delivered with the button set at “normal use” (MID). But customer can adjust the temperature set depending on their habit and taste. If you feel the refrigeration is weak, then set the temperature control button at “strong” position. If you adjust the button in the freezer compartment as well, the refrigeration is stronger than adjusting refrigerator only.
The food in the chilled drawer is . not frozen but defrosted	■ **The chilled drawer does not freeze food.** • Use chilled drawer for storing fresh meat or fish for short periods. For storing for a long periods or freezing food, use a freezer compartment. It is normal that frozen foods thaw above the freezing temperature (in the chilled drawer).
Refrigerator water is not cool.	■ **Check the water storage location.** • If water is kept in the door rack, please ask to keep it in the refrigerator compartment shelf. It will then become cooler.
Ice cream softens.	■ **Explain the characteristics of ice cream.** • The freezing point of ice cream is below -15°C. Therefore ice cream may melt if it is stored in the door rack. • Store ice cream in a cold place or set the temperature control button of a freezer at “strong” position.
Refrigeration is too strong.	■ **Check the position of temperature control button.** • Check if refrigeration is strong in whole area of the refrigerator or partly near the outlet of the cooling air. If it is strong in whole area, set the control button at “weak”. If it is strong only near the outlet of cool air, keep food (particularly wet and easy to frozen such as bean curd and vegetables) away from the outlet.
Vegetables are frozen.	■ **Check the vegetables storage.** • If vegetables are stored in the refrigerator shelf or chilled drawer instead of vegetable drawer, they will be frozen. Set the control button at “weak” if they are also frozen in the vegetable drawer.
The food stored at inside of the shelf freezes even the control button is set at “MID”.	■ **Check if food is stored near the outlet of the cooling air.** • The temperature at cooling air outlet is always below the freezing point. Do not store food near the outlet of the cooling air as it block the air circulation. And do not block the outlet. If the outlet of the cooling air is blocked, the refrigerator compartment will not be cooled.

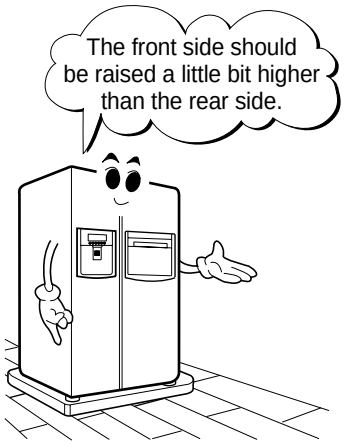
TROUBLE DIAGNOSIS

4-3. Odor and Frost

Problems	Checks and Measures
Odor in the refrigerator compartment.	■ **Explain the basic principles of food odor.** • Each food has its own peculiar odor. Therefore it is impossible to prevent or avoid food odor completely when food is stored in the completely sealed refrigerator compartment. Deodorizer can absorb some portions of the odor but not completely. The intensity of odor depends on refrigerator conditions and environments. ■ **Check the temperature control button and set at “strong”.** • Clean inside of the refrigerator with detergent and remove moisture. Dry inside the refrigerator by opening the door for about 3 or 4 hours and then set the temperature control button at “strong”.
Frost in the freezer compartment	■ **Explain the basic principles of frost formation.** • The main causes for frosting: - Door was left open. - Air penetration through the gasket - Too frequent door opening. (parties. etc.) - Hot foods are stored before they are cooled down. The temperature of freezer is -19°C. if temperature is set at “MID”. If hot air comes into the refrigerator, fine frost forms as cold air mixes with hot air. If this happens quite often, much frost forms inside of the refrigerator. If the door is left open in Summer, ice may form inside of the refrigerator.
Frost in ice tray.	■ **Explain basic principles of frost formation.** • When ice tray with full of water is put into a freezer compartment, the water evaporates. If cool air fan operates, the moisture attached to the jaw (protruded part) of ice mold shall freeze and form frost. If warm water was put into the ice mold, the situation will become worse.

TROUBLE DIAGNOSIS

4-4. Others

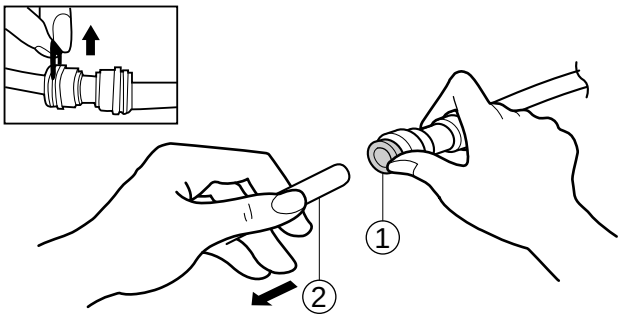
Problems	Checks and Measures
The refrigerator case is hot.	■ Explain the principles of radiator. • The radiator pipes are installed in the refrigerator case and partition plate between the refrigerator and the freezer compartment in order to prevent condensation formation. Particularly in summer or after installation of refrigerator, it may feel hot but it is normal. If there is no enough space to dissipate heat, it can be hotter due to lack of heat radiation. Please install a refrigerator in a well-ventilated place and leave a clearance between refrigerator and wall:
Small holes in a door liner	■ Explain that the hole is for releasing gas. • A small hole in the door liner is for releasing gas during insulation materials lining work. With a releasing hole, forming can be easily done .
Electric bills are too much.	■ Check the use conditions. • Too frequent door opening and hot food storing cause the compressor to operate continuously and hence increase the electric consumption and bills.
Condensation on the inside wall of the refrigerator compartment and the cover of properly vegetable drawer.	■ Explain how to store foods • Condensation forms when refrigerator is installed at damp area, door is frequently opened, and wet foods are not stored in the air tight container or wrapped. Be sure to store wet foods in the air tight container or in the wrap.
When is the power connected?	■ When should the power be connected ? • You can connect the power right after the installation. But if the refrigerator was laid flat during transportation for a long period of time and the refrigerant and compressor oils are mixed up, then this will affect badly the performance of a refrigerator. Be sure to connect the power 2~3 hours after refrigerator is installed.
Door does not open properly. 	■ Refrigerator compartment door does not open properly. • When the door is open, warm open air comes into the compartment and is mixed up with cool air. This mixed air shall be compressed and increase the internal pressure when door is closed. This causes the door sticked closely to the refrigerator in a moment. (If the refrigerator is used for a long time, it will then open smoothly.) ■ When the refrigerator compartment door is open and close, the freezer compartment door moves up and down. • When the refrigerator compartment door is open and close, fresh air comes into the freezer compartment and moves up and down the freezer compartment door. ■ Door opens too easily. • There is a magnet in the gasket rubber so that it is ok. if door is securely closed without a gap. It can be open easily if the foods in the refrigerator or freezer compartments hold the door open. ■ A door does not close properly. • If the rear side of the refrigerator is raised higher than front side, door shall not be easily closed. Adjust the level of refrigerator with levelling screws.

HOW TO DISASSEMBLE AND ASSEMBLE

1. DOOR

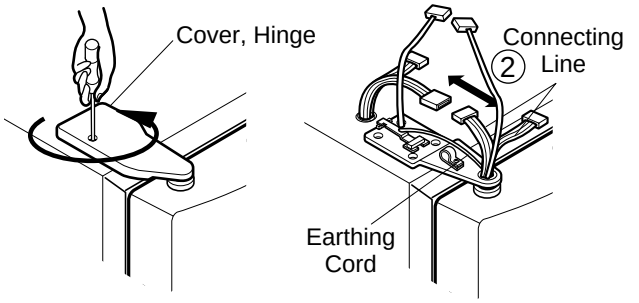
1) Remove lower cover and remove clip then disconnect water supply tube in the lower part of freezer door.

• Pull a water supply tube ② forward while pressing ① part to disconnect water supply tube as shown below.

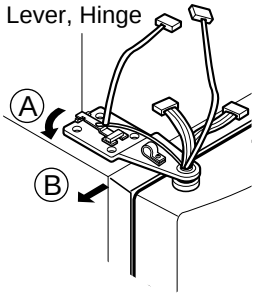


2) Remove a freezer door.

(1) Loosen hinge cover screw of freezer door and remove cover.
Disconnect all connecting lines except earthing cord.

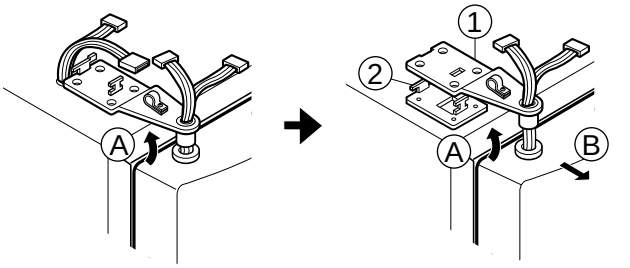


(2) Turn hinge lever in arrow Ⓐ direction until it is loosened and take it out in arrow Ⓑ direction.

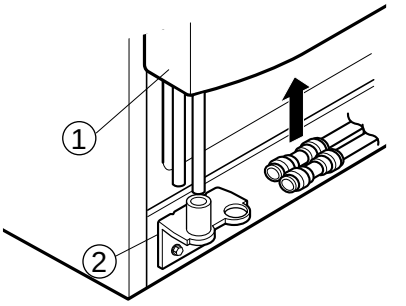


Note : • *When disconnecting refrigerator door, turn hinge lever counterclockwise.*
• *If hinge lever or bracket hinge pin is deformed during assembling freezer and refrigerator doors, fix two screws (Tap Tite Screw, M6: Hinge, L fixing screw) in the hole of upper hinge.*

(3) Disconnect upper hinge ① from a hinge supporter ② by grasping the front part of upper hinge and lifting up (Hinge Assembly, U) in arrow direction Ⓐ and pull forward in arrow Ⓑ direction. Be careful as the door may be fallen down.



(4) Lift up the freezer door ① in arrow direction and disconnect the door from the lower hinge ②. Don't pull a door forward.



Note : • *Lift up a freezer door until a water supply tube is fully taken out.*

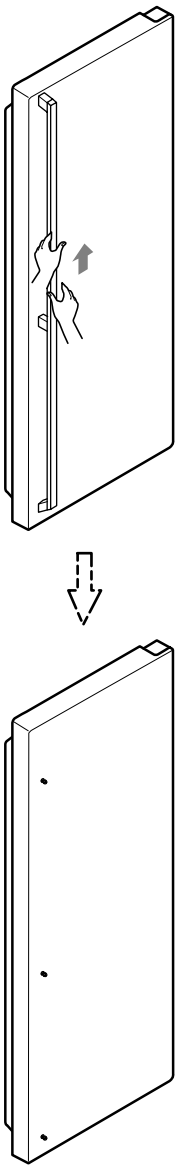
(5) Assembly is the reverse order of disassembly

HOW TO DISASSEMBLE AND ASSEMBLE

2. HANDLE

1) Aluminum short handle Model

(1) Grasp the handle by both hands and hold it upward.



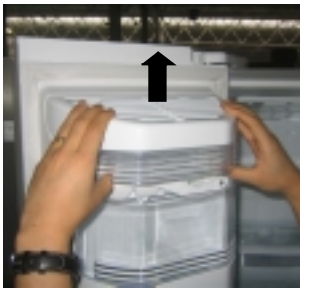
3. SHROUD, GRILLE FAN

1) Loosen screws after disconnecting a cap screw of a grill fan(U) with a blade screwdriver.
2) Disassembly of a grille fan(U) : Pull forward after opening hook at → part with a blade screwdriver.
3) Disconnect housing and disassembly of shroud F(U) : holding upper part and pull forward
4) Disassembly of a grille fan(L) : Hold upper part of a grill fan(L) and pull forward carefully
5) Check foam PU sticking conditions around a shroud, F(U) and F(L) during assembling. If damaged, torn or badly sticked, assemble with a new one after sealing well.

4. ICEMAKER ASSEMBLY

1. How to disassemble :

(1) Remove the cover and ice bucket from the freezer door.



(2) Disassemble the Motor, AC and icemaker

Loosen four screws.

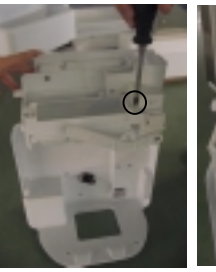
Lift up the Motor, AC assembly

Pull out the Motor, AC with swing like this figure.

• **Caution :** When pulling out the Motor AC, do not damage the water injector.

(3) Disconnect housing and loose screws

Disconnect the housing



Loosen screw of guide water

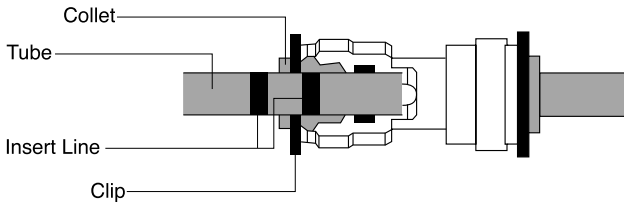
Loosen screws of icemaker and pull out the icemaker.

HOW TO DISASSEMBLE AND ASSEMBLE

5. WATER VALVE DISASSEMBLY METHOD

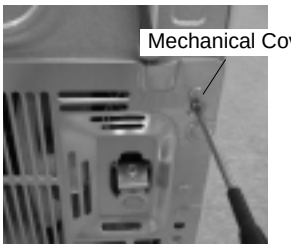
1) Turn off the power of the refrigerator (pull out the plug). Open the FREEZER and REFRIGERATOR Door and disassemble the Lower Cover.

2) Lay a dry towel on the floor and get ready to spill water from the water tank.
Pull out the Clip. Then press the collet to separate the tube from the connector and pour out the water until emptied.
(Refer to the label attached on Front L on how to separate the tube.)

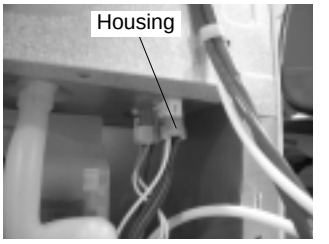


3) Turn off the water. Then separate the water line from the valve.

4). Separate the Mechanical Cover and Valve Screw.

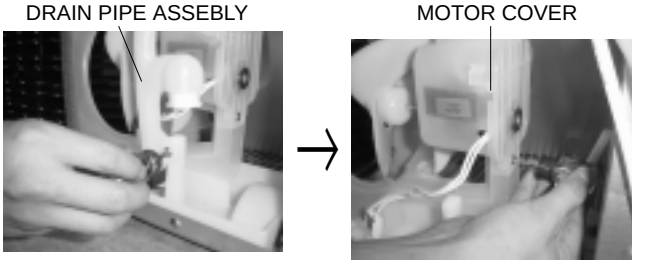


5) Separate the housing and pull out the valve.

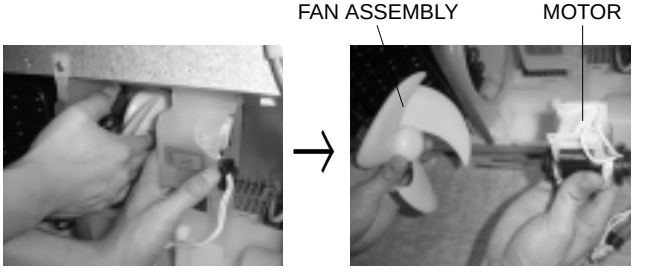


6. FAN AND FAN MOTOR DISASSEMBLY METHOD

1) Using a short screwdriver, loosen one SCREW in DRAIN PIPE ASSEMBLY and one connected to the MOTOR COVER.



2) Pull and separate the FAN ASSEMBLY and MOTOR turning counterclockwise based on the MOTOR SHAFT.



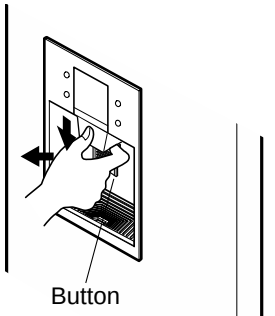
The assembly is in the reverse order of the disassembly and take special care for the following details.

1. Be careful not to bend the tube during assembly.
2. Press the WATER DISPENSER button until water pours out and check for leakage in the CONNECTOR TUBE (It differs by the water pressure but usually takes about 2 minutes until water pours out.)

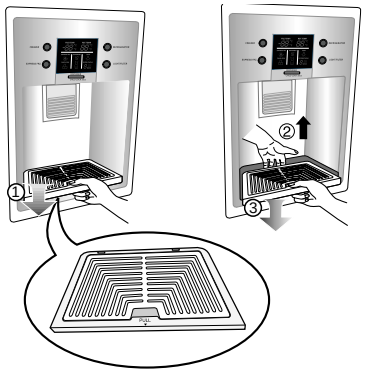
HOW TO DISASSEMBLE AND ASSEMBLE

7. DISPENSER

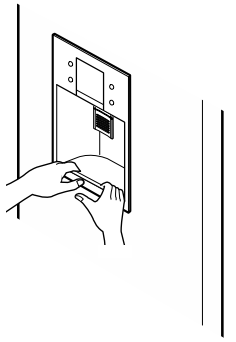
1) Disconnect funnel assembly by pulling down and forward.



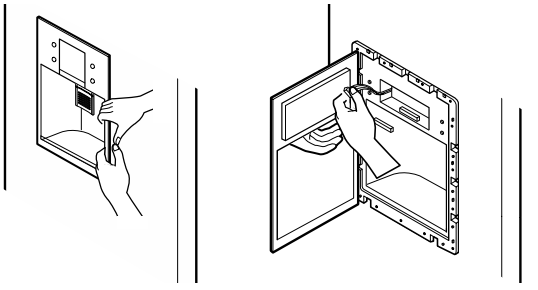
2) Disconnect the cover by pulling it fully to the front ① and pull up the rear end of the cover ② slightly to pull it out ③.



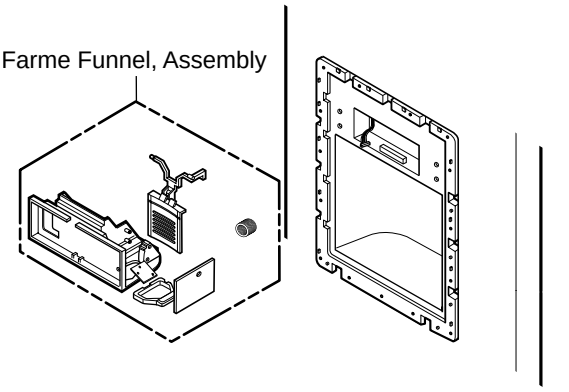
3) Remove a dispenser cover assembly by pulling a low side. It is attached with a hook so be pulled carefully



4) Remove a dispenser cover assembly by pulling a right and left side. It is attached with a hook so be pulled carefully. After sepsrating a dispenser cover, you have to disconnect its housing

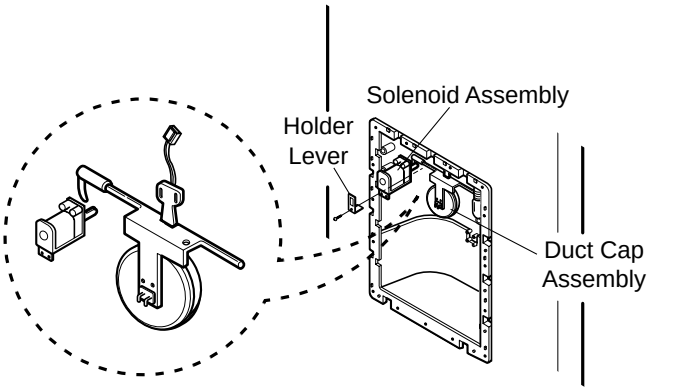


5) Loosen fixed screws with a screwdriver and pull the funnel assembly to disconnect.

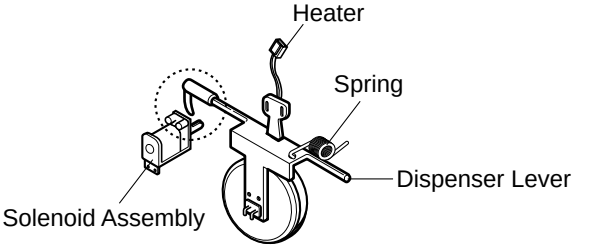


※ You can change LED Lamp in this disassemble state

6) The duct cap assembly can be disconnected if the hold lever connecting screw is loosened with a screwdriver.

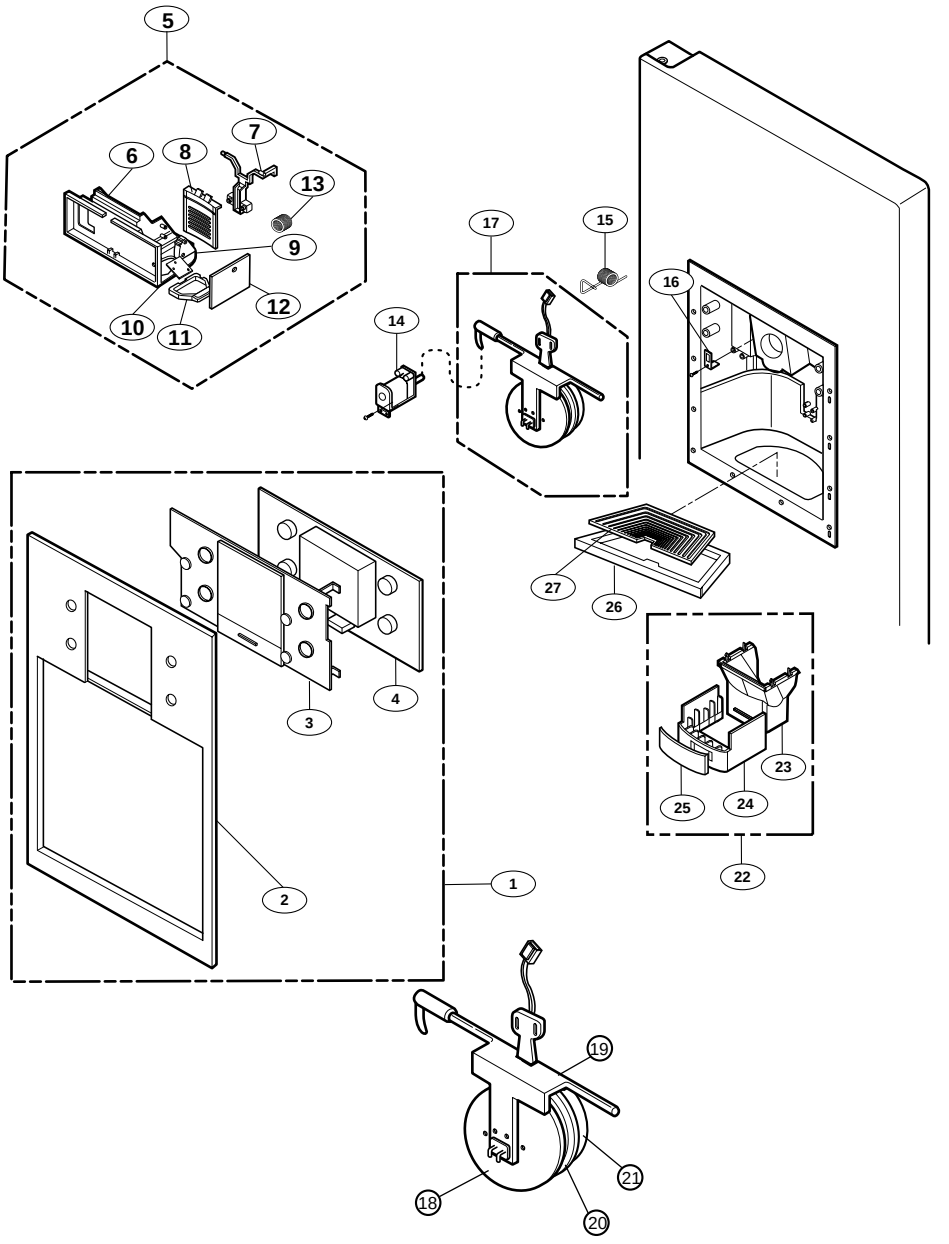


7) To install the duct cap assembly, insert one end of the spring into the right hole of the dispenser lever and insert the other end into the right hole in the top part of the dispenser. Then attach the holder at the solenoid switch.



HOW TO DISASSEMBLE AND ASSEMBLE

8) Dispenser Related Parts



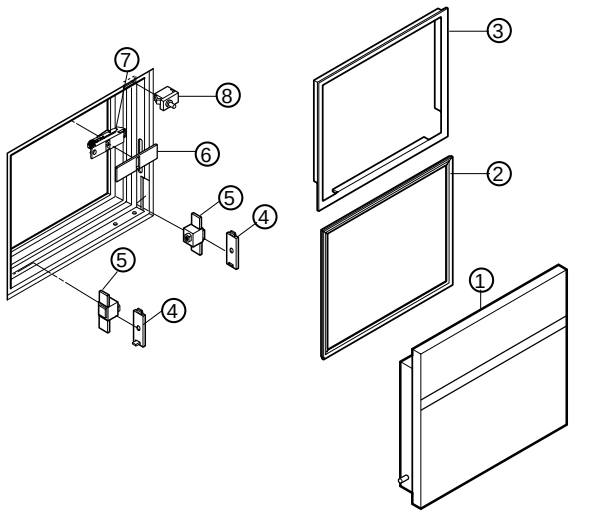
1	COVER ASSEMBLY, DISPENSER
2	COVER, DISPENSER
3	DECO COVER, DISPLAY
4	PWB(PCB) ASSEMBLY, DISPLAY
5	FRAME FUNNEL, ASSEMBLY
6	FRAME, FUNNEL
7	LEVER, DISPENSER
8	BUTTON, LEVER
9	SWITCH, MICRO
10	PCB ASSEMBLY, DISPLAY
11	SUPPORTER, HOLDER
12	SHEET DUCT
13	SPRING, LEVER
14	SOLENOID, ASSEMBLY
15	SPRING
16	LEVER, HOLDER
17	CAP ASSEMBLY, DUCT
18	CAP, DUCT
19	DISPENSER, LEVER
20	FOAM, NEW
21	RUBBER, CAP
22	FUNNEL, ASSEMBLY
23	FUNNEL
24	DECO, COVER
25	DECO, PANEL
26	DECO, DRAIN
27	DECO, DRAIN(COVER)

< (17) Cap Assembly, Duct Detailed Drawings>

HOW TO DISASSEMBLE AND ASSEMBLE

8. HOME BAR

8-1. Home Bar related parts



1 DOOR ASSEMBLY, H/BAR	5 HINGE ASSEMBLY, H/BAR
2 GASKET, H/BAR	6 COVER, LEVER
3 COVER, H/BAR	7 HOLDER ASSEMBLY, BRACKET
4 COVER, FRAME	8 SWITCH, PUSH BUTTON

8-2. Home Bar parts disassembly and assembly

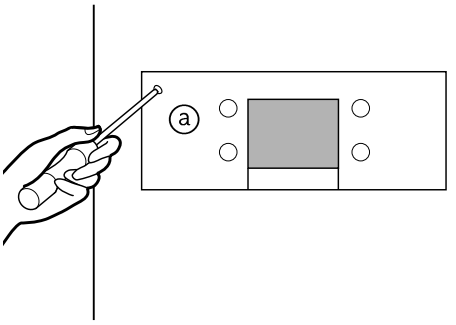
1) Disassmble H/Bar.

Using a flat driver or a pick tool, separate a home bar

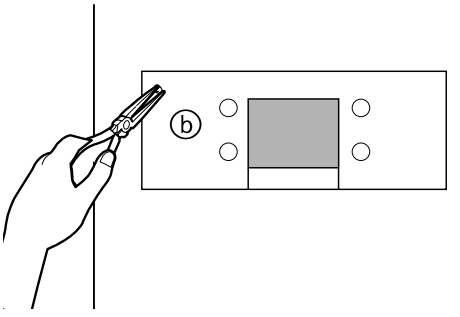
2) Assembly H/Bar.

First, you insert a right side, and push a home bar hinge on left side(ⓐ).

9. DISPLAY COVER ASSEMBLY (GW-C227/B227)



Fixing a screw to the display by using a screwdriver (ⓐ).

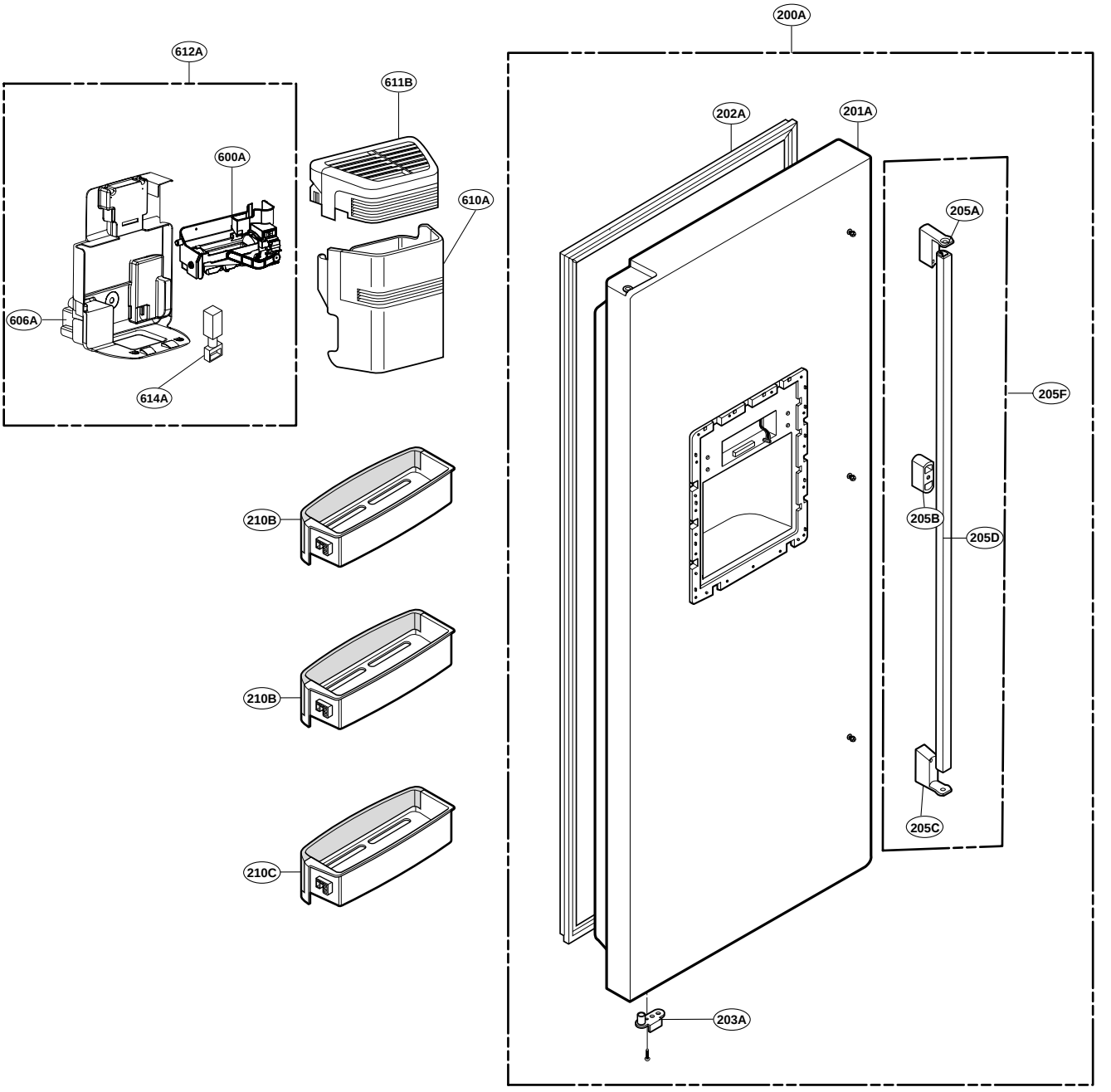


Separate the display by using a flyer (ⓑ).

EXPLODED VIEW

FREEZER DOOR PART : GW-P227 / L227

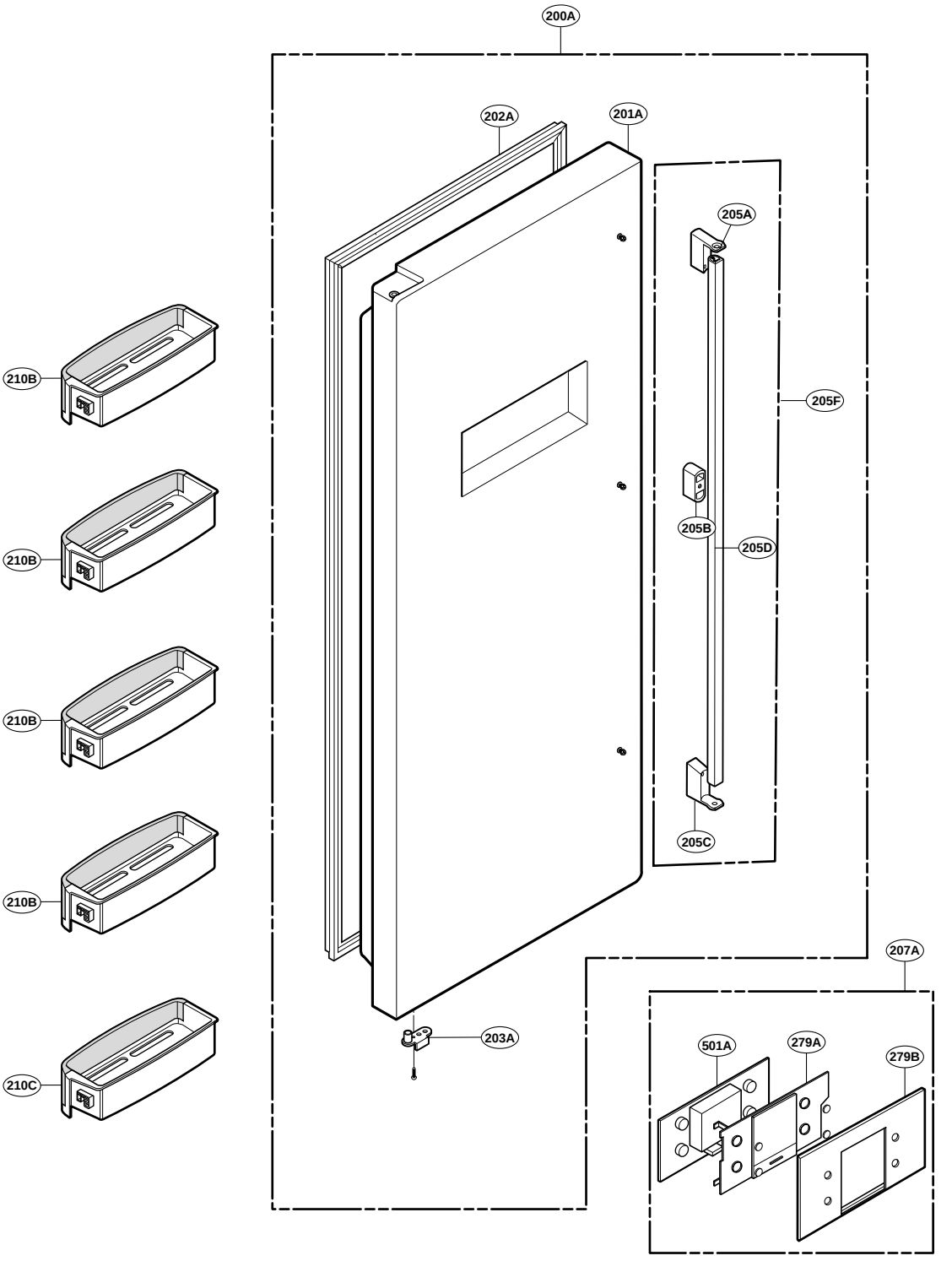
*** : Optional part**



EXPLODED VIEW

FREEZER DOOR PART : GW-C227,/ B227

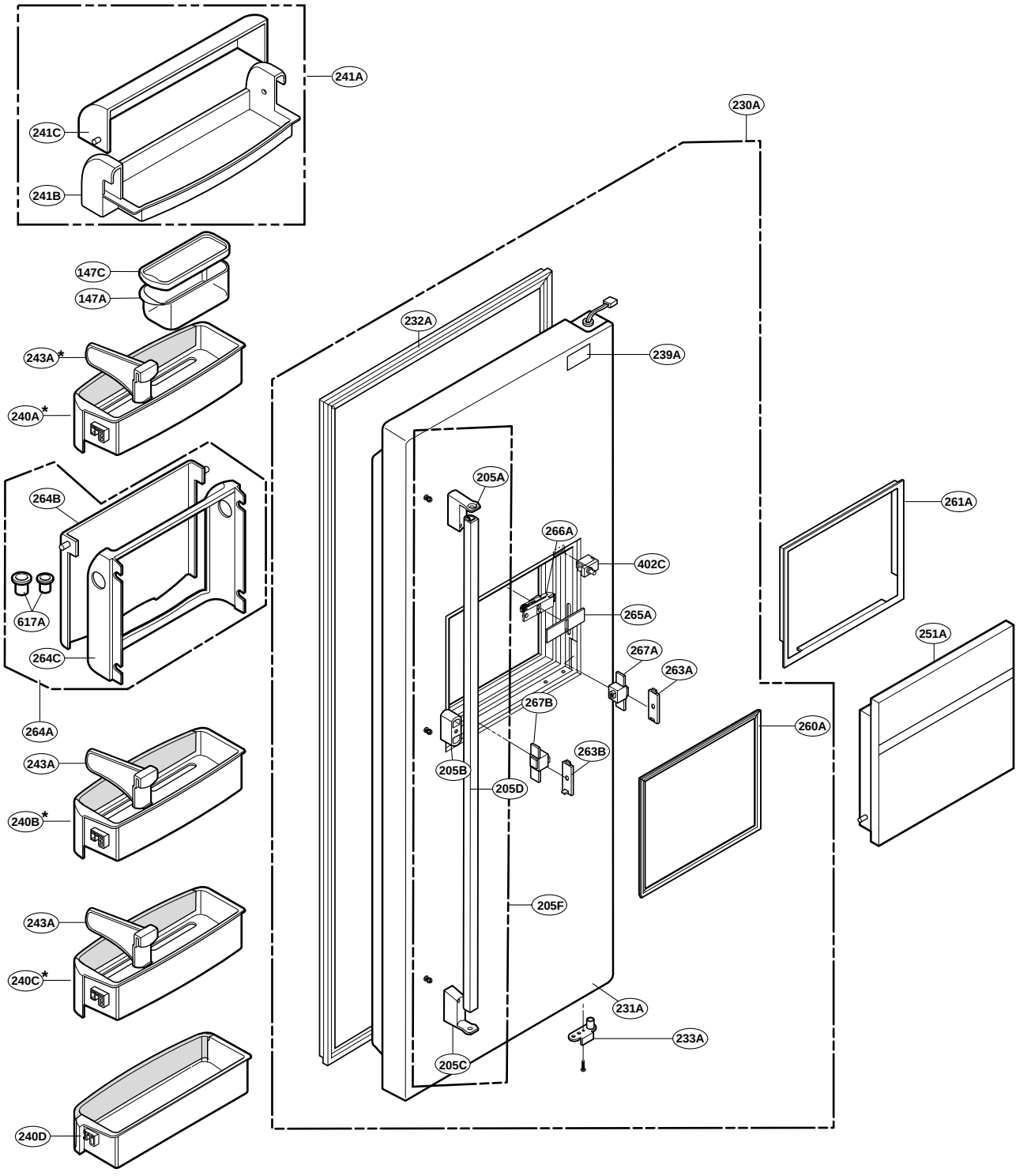
*** : Optional part**



EXPLODED VIEW

REFRIGERATOR DOOR PART : GR-P227 / C227

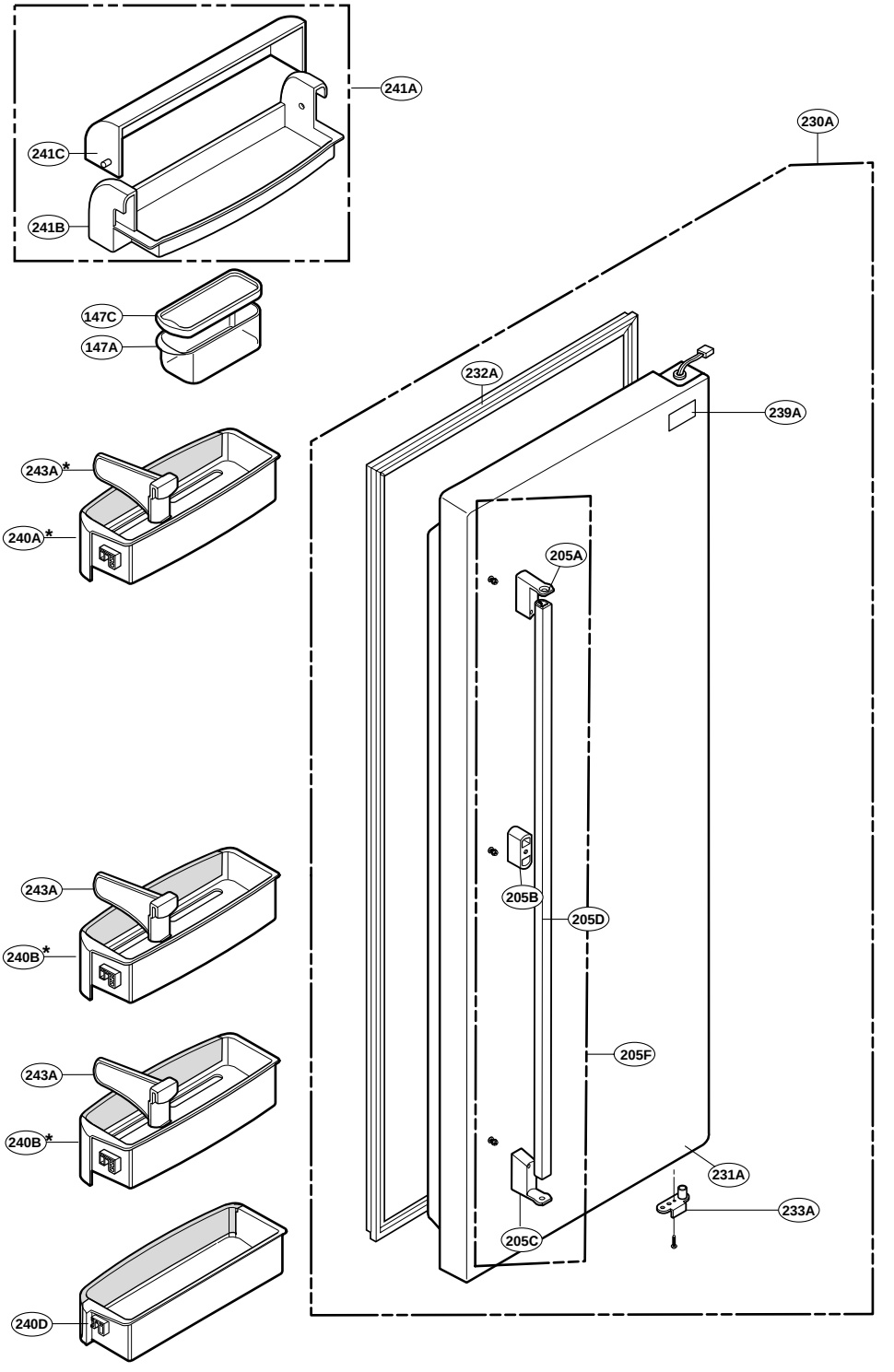
*** : Optional part**



EXPLODED VIEW

REFRIGERATOR DOOR PART : GW-L227 / B227

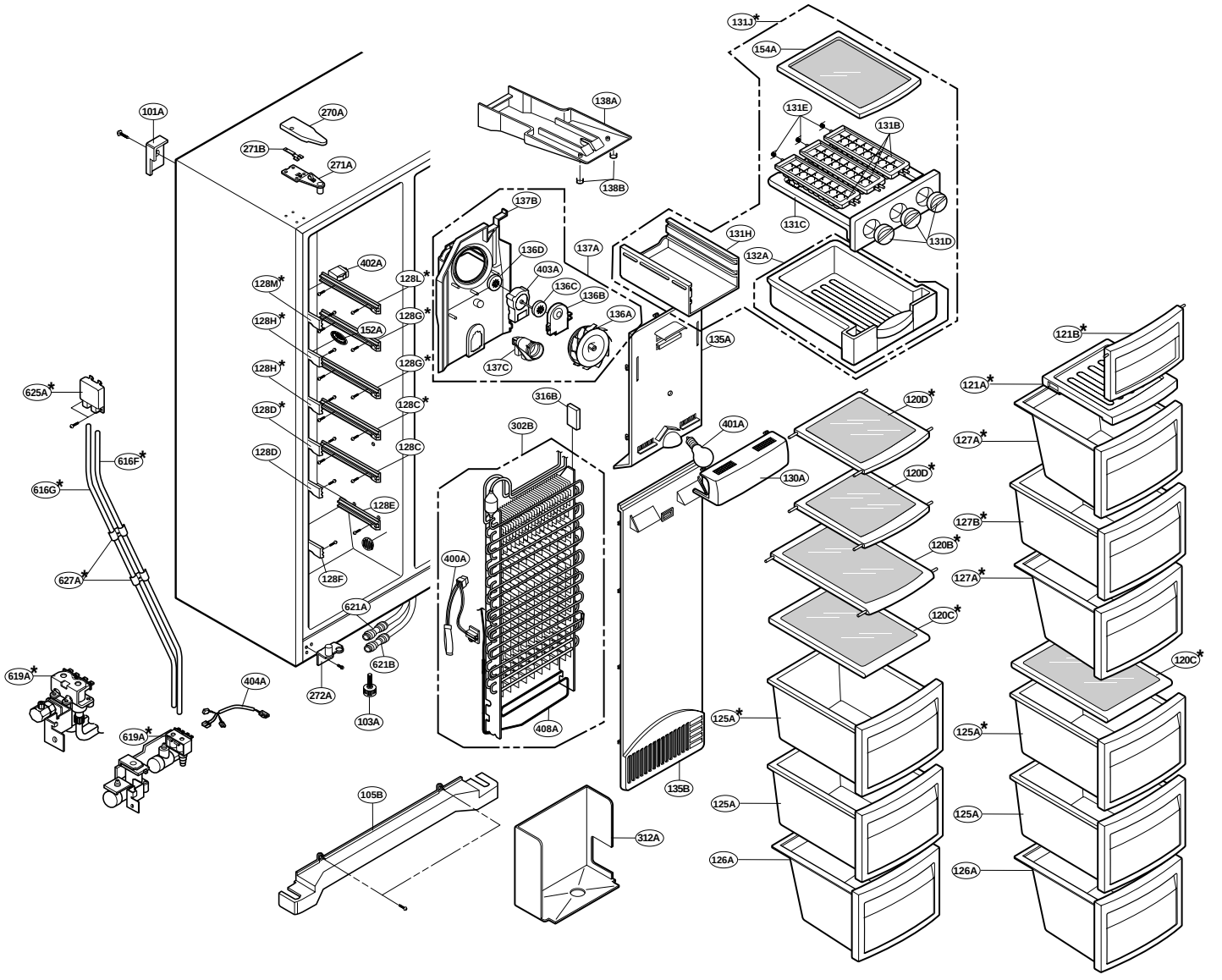
*** : Optional part**



EXPLODED VIEW

FREEZER COMPARTMENT

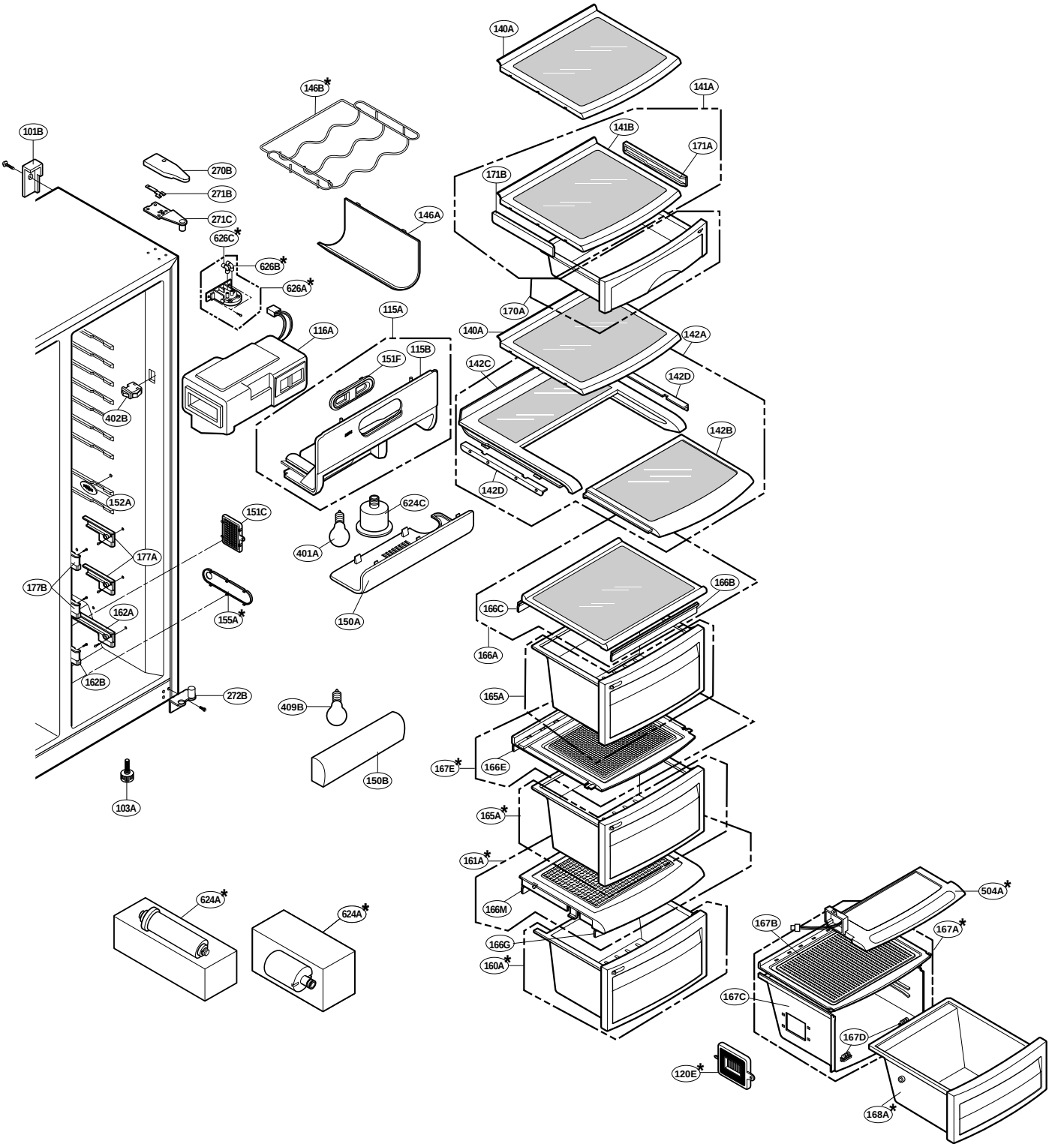
*** : Optional part**



EXPLODED VIEW

REFRIGERATOR COMPARTMENT

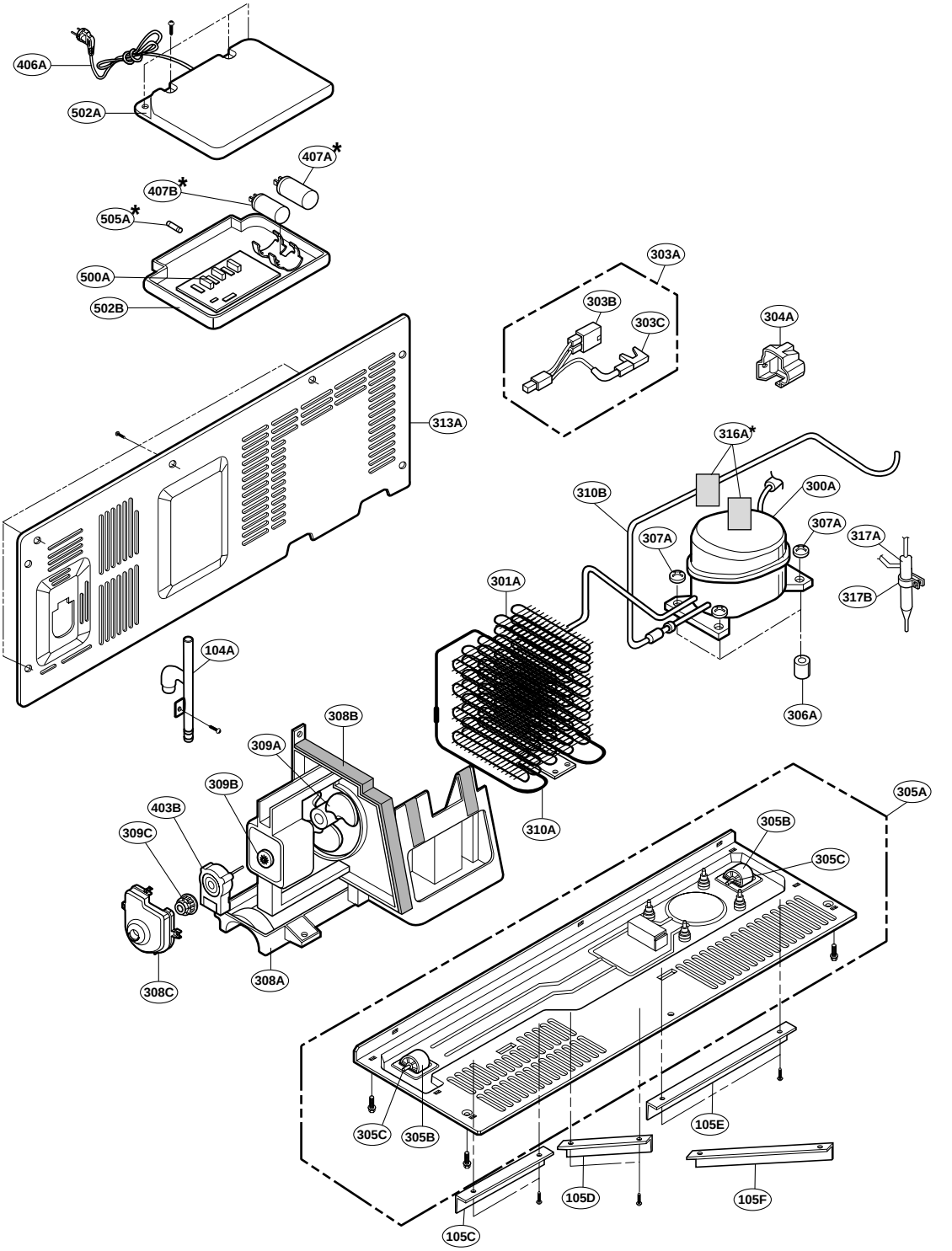
*** : Optional part**



EXPLODED VIEW

MACHINE COMPARTMENT

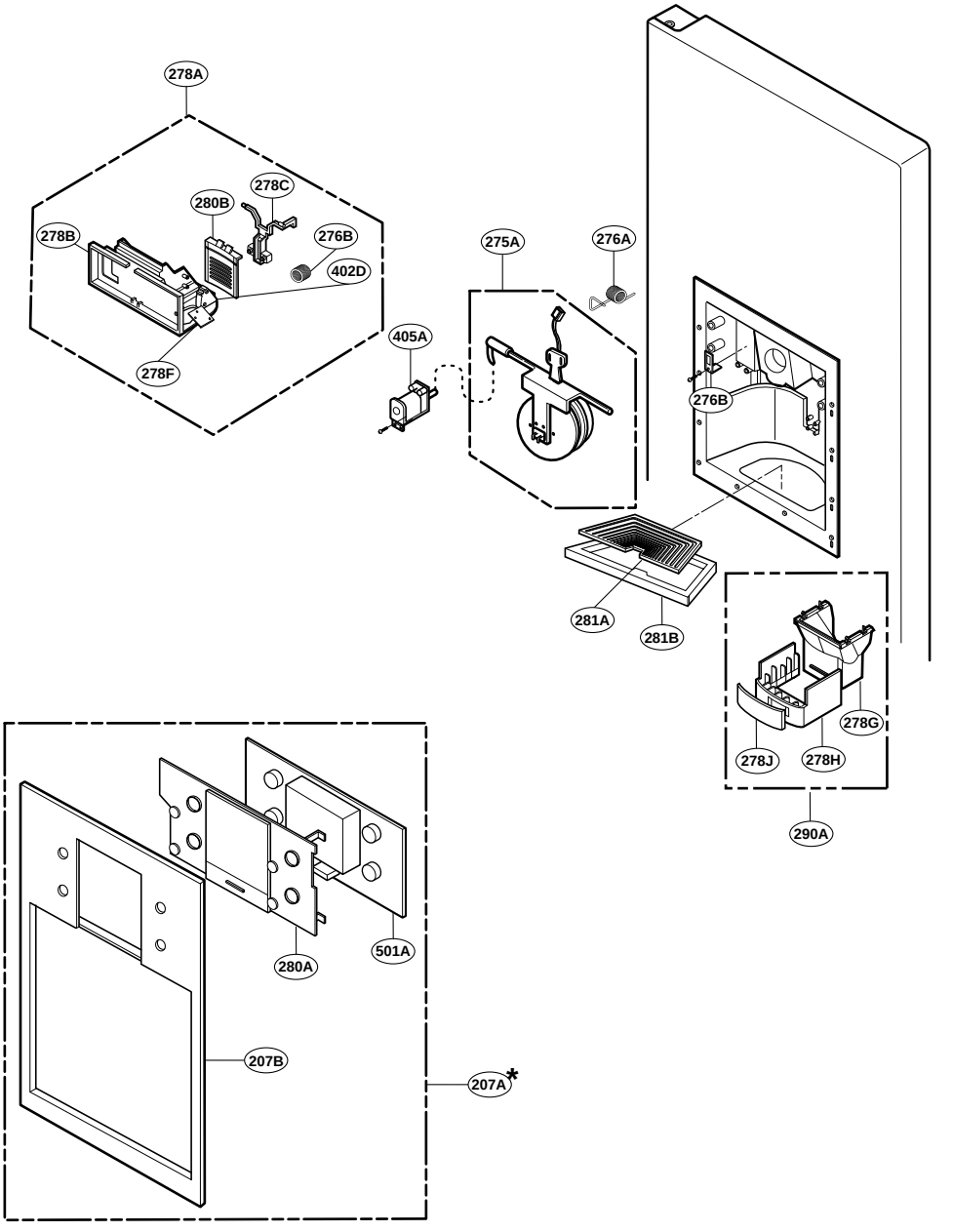
*** : Optional part**



EXPLODED VIEW

DISPENSER PART

*** : Optional part**



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